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UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 1125

Washington, D. C. PROFESSIONAL PAPER February, 1923

THE SAIDY DATE OF EGYPT:

A VARIETY OF THE FIRST RANK ADAPTED TO COMMERCIAL CULTURE IN THE UNITED STATES.

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DISCOVERY OF THE COMMERCIAL VALUE OF THE SAIDY VARIETY OF DATE.

Of the hundreds of distinct varieties of the date palm recognized and propagated in the date-growing world scarcely a dozen have attained more than local importance and reputation, and of these only a few have attained commercial importance in Europe or America.

The discovery, then, of the commercial possibilities and adaptation to southern California conditions of the Saidy variety of Egypt marks a new era in date production in the United States.

This new candidate for commercial favor in our American date-growing regions has been known to European explorers of the oases of the Libyan Desert (Fig. 1) for more than a century under the name "Sayd" or "Saydeh," while accounts of the excellence of the dates of these oasis dependencies of Egypt and of the caravans which brought them to the Nile Valley reach back to very remote periods. Modern geographers and surveyors of the Libyan Desert

of western Egypt agree in reporting the Saidy as the most abundant date variety in the five Libyan oases—Siwa, Baharia (*1*)[1], Farafra, Dakhla (*2*), and Kharga (*3*).[2]

In Gizeh Province of Egypt, within sight of the great Pyramids and on the very site of the ancient city of Memphis, are growing many thousands of trees of this variety under the name of "Sewi" (*22*), undoubtedly due to an early importation of offshoots from the Oasis of Siwa.

ESSENTIAL CHARACTERS OF A GREAT COMMERCIAL VARIETY.

The important commercial varieties of dates all agree in possessing certain characters essential to securing a market among European or American peoples. They are attractive in size and appearance, soft and luscious in texture, and of sufficiently high sugar content and pleasing flavor to appeal to the palate of the large class of customers who regard the date as a confection and as yet do not appreciate the qualities of the dry or bread dates which are most sought by the desert dwellers.

From the grower's viewpoint a great commercial date variety must be highly productive, and the fruit must have a sufficiently high sugar content to be self-preserving and to keep without fermentation during a long transportation by land or sea, plus a reasonable period of storage before marketing. Added to these qualities the successful commercial variety must be fairly prolific in the production of offshoots, by which alone its true type can be multiplied.

THE PRINCIPAL COMMERCIAL VARIETIES OF DATES.

Among the few varieties of dates with the requisite characters to assure them places in the commercial list the Deglet Noor takes the lead, its exquisite flavor and attractive appearance having long ago caused it to reach the top of the market in continental Europe and to be sold also for the fancy holiday trade in England.

Next to the Deglet Noor, the "Tafilet," or Medjhool, from the Tafilalet Valley of southeastern Morocco, since the occupation of Spain by the Arabs has held a high reputation in that country and almost as high in England. Sometimes this variety, in spite of its unattractive appearance and notwithstanding the fact that it is sold almost entirely in bulk instead of in attractive packages, brings high prices.

The third date of high market quality is, perhaps, the Fard, of the Semail Valley in the Sultanate of Maskat in southeastern Arabia. This is a small dark-colored date, but of attractive appearance, and the flavor is evidently appreciated by the American consumers, since it brings the highest price of all the varieties brought to this country from the Persian Gulf region.

The fourth of the great commercial dates of the world is doubtless the Halawi, from the lower Euphrates Valley in Mesopotamia. This variety has the highest output of all commercial dates grown and is sold in enormous quantities in the English and especially in the Amer-

[1] Serial numbers (italic) in parentheses refer to "Literature cited" at the end of this bulletin.

[2] The spelling of these oasis names, except where quoted, follows that used by the surveys department of the Public Works Ministry of Egypt.

ican markets.[3] The imports to America of this variety reach as high as twenty to thirty million pounds a year, and the dates sell at wholesale prices ranging from 5 to 7 cents a pound in normal times. At this price it is the cheapest dried fruit suitable for consumption without cooking or other preparation that reaches the American market in large quantities. It does not compare in quality with any of the other dates named, but it does compete with them advantageously in price.

CHARACTER AND EARLY HISTORY OF THE LIBYAN OASES, THE HOME OF THE SAIDY DATE.

These oases are irregular depressions in the great Libyan Plain, largely the result of wind erosion. Their only source of water at present is numerous artesian wells, though doubtless natural springs were found in prehistoric times. Many of these wells were bored during the Roman occupation, about the beginning of the Christian era. According to Beadnell (*2*), the Dakhla Oasis has about 420 ancient Roman wells still in active operation, though supplemented now by many modern ones. The source of this artesian supply is believed to be the rain belt of the African interior.

According to the same authority, the Dakhla Oasis had a total of nearly 200,000 date-palm trees in 1901, or about 7½ trees for each inhabitant. The greater number of these palms are of the Saidy variety. The dates from these oases for many years have been brought over to the Nile Valley by the Bedouin traders, who sell them under the name "Wahi," which in Arabic means the date from "el wâh," or the oasis.

EARLY EGYPTIAN KNOWLEDGE OF THE DATE PALM.

The history of the oases has been interwoven with that of Egypt from a most remote period. Evidence has been found not only of the predynastic occupation of Kharga, but it has been conclusively shown by Beadnell that this reached back into a stone age. We can not conceive of a population in these oases, distant a journey of only a few days from the Nile or from the Mediterranean coast, not being in more or less close touch with the Nile countries and governments. Apparently from a very early period the Egyptian governments sought to rule these oasis dwellers and to collect tribute from them. Sometimes under nominal subjection, they were by no means loyal, and repeated rebellions had to be put down.

The oases were made places of banishment for political offenders, even of royal blood, and following the Christian era many noted men of the Coptic Church were banished to both Kharga and Siwa, so that a Coptic community of many thousands existed at Kharga, and the ruins of the Christian necropolis vie in interest with the temples of the Egyptian deities. Kharga was from a very remote time an

[3] In the lowest commercial rank may be placed such dates as the Khadrawi and Sayer, also from the Mesopotamian region, which are not bought willingly by the importers of dates into America, but are merely included in bulk purchases of the entire output of an orchard. Considerable quantities of these varieties reach America and England, where they are sold at prices from 10 to 25 per cent below those paid for Halawi dates. Small quantities of the Amri date, a large but poorly flavored variety from Egypt, are shipped to Europe, but this date can not be said to play any important part in the markets of the world.

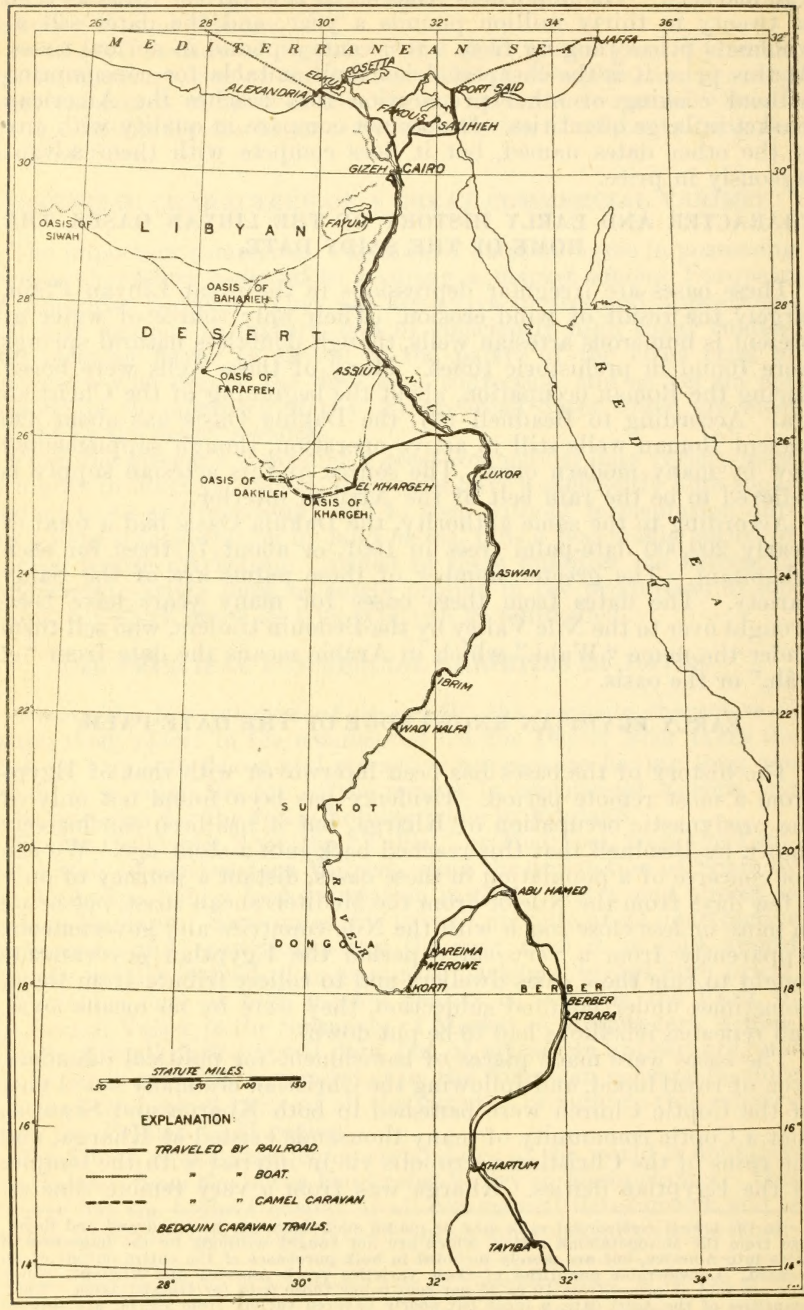


FIG. 1.—Map of Egypt and the Sudan, showing the route of travel and the localities where dates were studied.

important station on the great caravan route between the upper Nile countries and Egypt, just as Siwa was on the great caravan route to west Africa when Herodotus wrote of the stations from Thebes to the Pillars of Hercules.

Fischer (*13*) calls attention to the writings of Dümichen (*11*) and Brugsch (*8*) on ancient Egyptian inscriptions bearing on the Libyan oases.

Brugsch (*8*), who made a close comparison of the early Egyptian references to the western oases, contends that the Arabic word for oasis, *wâh*, is from the Coptic *wah* or *uah*, and that this again is derived from an early Egyptian word for an envelope or the wrapping of a mummy, *ouit* or *uax*.

Breasted records that Puemre, architect under Queen Hatshepsut and later under Thutmos III (1501 to 1447 B. C.), is represented as receiving "tribute from southern and northern oases," while the scribes record the amount (*5*, v. 2, pp. 385–386); and Intef in his stila, where he describes himself as the "Royal Herald of Thutmos III," also proclaims himself as "chief of all the oasis country" (p. 763). But the oasis dwellers have been hard to hold in subjection, and Mereneptah, successor to Rameses II (1225 to 1215 B. C.), was confronted with a combined invasion by the Libyan forces and the coast peoples, which the inscriptions show he was able to overthrow with a great slaughter and the capture of many prisoners (p. 569).

Dümichen (*11*), after a most painstaking study of the early inscriptions, tells us that the ancient name of Siwa Oasis was "Sokhit am or ami," signifying an "orchard of palms" (Fig. 2), and that the Egyptian name for the dwellers of Siwa was literally "men of the palm orchards (Palmenhainmänner). He gives us most graphically this further conclusion (p. 33):

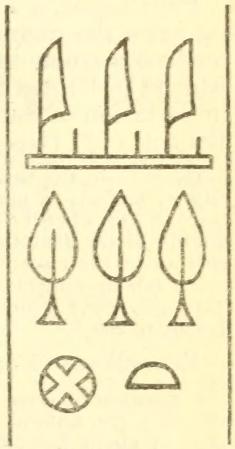


FIG. 2.—Ancient name of Siwa Oasis, "Sokhit am or ami," signifying "orchard of palms."

Already in ancient times there were established caravan routes between the oases and the upper, middle, and lower sections of Egypt, over which there came in great quantity the valuable products of the oases; especially wine from Chargeh and Dachel, dates from Siwa, and natron from the Wadi el Natron; also olives and lemons, medicinal herbs, dyestuffs, and many other articles.

The earliest of these inscriptions he places at the time of "Thutmosis III, the sixteenth century B. C. (16 Jahrh. v. Chr.)." (It will be noted that Breasted places this reign considerably later.) This is most interestingly confirmed by Ball and Beadnell (*1*) in their account of the Egyptian antiquities of Baharia Oasis. They refer to the discovery by Ascherson in 1876 of a stila of the time of "Thotmes II," showing that at that early period (between 1501 and 1447 B. C., according to Breasted) this oasis was an Egyptian dependency and the worship of Egyptian deities was established there.

A most characteristic record of this oasis region of artesian wells was a suit for the possession of a "flowing spring" and "cistern" brought by Nesubast, before Waycheset, the new governor, "lord of the oasis" (of Kharga and Dakhla) and "chief of irrigation," appointed by Sheshunk I, of the Twenty-second Dynasty (945 to 924

B. C.). After a delay of 14 years this claimant won his suit and had his title established (*5*, v. 3, pp. 726–727).

ACCOUNTS OF OASIS DATES BY MODERN TRAVELERS.

The first modern European traveler to visit Kharga Oasis seems to have been Poncet (*23*), who wrote of his journey from Syout (modern Assiut, or Siut), in October, 1698, in his "Voyage to Ethiopia," as follows:

> Having at my Return found all the Company met, we set forward on the 2d of October early in the Morning, and from that very day we entered a frightful Desert. . . . We arrived on the 6th of October at Helaoue: 'Tis a pretty large borough and the last that is under the Grand Signior's Jurisdiction. . . . Helaoue is very pleasant and answers fully its Name, which Signifies a Country of Sweetness. Here are to be seen a great Number of Gardens watered with Brooks, and a World of Date-Trees which preserve a continual Verdure.

Paul Lucas, a French traveler who was commanded by Louis XV to write the account of his voyages, about 1700, gives the earliest modern account of the date industry of the Oasis of Baharia, from which the United States Department of Agriculture obtained its first importation of Saidy offshoots under their true name. He is cited by Rennell (*24*) (Geog. of Herodotus, v. 2, pp. 204–205), as follows:

> There is in the desert, at the distance of *some* journeys[4] from Faiume (the city so named), a place of inconsiderable extent full of palm trees which bear the *best dates* in all *Egypt*. [The same is said by Jacutus, respecting the superior quality of the fruits of the oases.] The Arabs, who possess and cultivate this spot, draw their scanty supplies of water from the wells, which they have, with much labour and industry, dug in the desert, and water them with great care. They pay their tribute to the Pacha in dates. (Vol. ii, of the Third Voyage of Lucas, p. 206.)

Rennell says:

> A position of some journeys' distance from the Faiume, and in the desert to the west, can answer to no other place than the Lesser Oasis, which by our *data* falls at about five journeys from the town of Faiume; four from the nearest part of the lake of the same name.

As the "Lesser Oasis," or "Oasis Parva," was the earlier designation of what is now known as Baharia, where in January, 1820, Cailliaud (*9*) noted that "the best dates of the region are called Saydeh;" no great stretch of the imagination is needed to suppose that in the time of Lucas, about 1700, there were gardens of Saidy trees which bore "the best dates in all Egypt," from which the tribute to the pasha was paid, for we may be sure that potentate accepted as tribute none but the best.

William G. Browne (*7*) was the first modern traveler to reach the Oasis of Siwa or Jupiter Ammon. In his account of this journey he says:

> The information I had obtained in Alexandria having induced me to resolve on attempting to explore the vestiges of the Temple of Jupiter Ammon from that place, I procured a proper person as interpreter and made the necessary arrangements with some Arabs, who are employed in transporting through the desert dates and other articles between Siwa (a small town to the westward) and Alexandria, to convey my baggage and provisions and to procure for me a secure passage among the other tribes of Arabs, who feed their flocks at this season in the vicinity of the coast. * * * When the Arabs had finished the

[4] Ancient writers frequently refer to the distance traveled in a day by caravan as a "journey."

business on which they came to the city, and had fixed on an hour, as they thought, auspicious to travelers, they made ready for departure and on Friday, 24th February, 1792, we left Alexandria.

They took the route by the seacoast, "the same that Alexander had chosen for the march of his army." On Sunday, the 4th, after 75½ hours of actual travel along the Mediterranean coast, they watered the camels at a well affording a copious supply of sweet water, then struck inland, toward the southwest.

On Wednesday, the 7th, at night, we had reached a small village called Karet-am-el Sogheir * * * This village is independent, and its environs afford nothing but dates, in which even the camels and asses of this quarter are accustomed to find their nourishment * * * For about a mile and a half from Karet-am-el Sogheir the country is sprinkled with dates, and some water is found.

They arrived at Siwa on Friday, the 9th, late at night, after 62¼ hours of actual travel from the coast.

We at length came to Siwa, which answers the description given of the oases, as being a small fertile spot, surrounded on all sides by desert land. It was about half an hour from the time of our entrance on this territory, by a path surrounded with date trees, that we came to the town, which gives name to the district.

This first Christian visitor to their oasis for many centuries was not made at all welcome by these Mohammedans;[5] in fact, he was at times in no small danger. He was naturally more interested in the ruins of the ancient temple than in their agriculture, but he takes time to tell us:

The oasis which contains the town Siwa, is about 6 miles long and 4½ or 5 wide. A large proportion of the space is filled with date trees; but there are also pomegranates, figs and olives, apricots and plantains; and the gardens are remarkably flourishing. * * * Their list of household furniture is very short, some earthenware made by themselves, and a few mats form the chief part of it, none but the richer order being possessed of copper utensils. They occasionally purchase a few slaves from the Marzouk caravan. The remainder of their wants is supplied from Kahira or Alexandria, whither their dates are transported, both in a dry state and beaten into a mass, which when good in some degree resembles a sweetmeat. * * * They drink in great quantities of the liquor extracted from the date tree, which they term *date-tree water*, though it has often, in the state they drink it, the power of inebriating.

Frederick Horneman (*18*) was the next after Browne to reach the Oasis of Siwa and explore the ancient temple of Jupiter Ammon. His account of the journey from Cairo to Aujila adds something to the fund of information accumulated from other travelers. He joined a company of merchants of Aujila, who had their rendezvous at "Kardassi" or "Kardaseh," still a well-known village a few miles north of the Gizeh Pyramids, from the vicinity of which the writer purchased date offshoots in the springs of 1920 and 1922.

The party set out from this village on September 5, 1798, joining "the great body of the caravan, which yearly returns from Mecca." The caravan went by the way of Wadi el Natrun, and on the eleventh day, September 15, the traveler says, "we came to an inhabited spot, after 5 hours' march arriving at the small village of *Ummesogeir*." This is the junction point with the trail from Alexandria along the coast, over which Browne had arrived March 7, 1792, recording the village as "Karet-am-el Sogheir."

[5] Recent travelers there report very hospitable treatment, which accords with the writer's experience in Kharga and Dakhla.

Horneman says,

The people of Ummesogeir are, indeed, in every respect poor, depending wholly for subsistence on their dates, which they in part sell to the Arabs of the desert and in part carry to Alexandria and exchange for corn, oil, or fat.

Of Siwa, after a general description of the town and people, he tells us:

Its soil is a sandy loam, in some places rather poached or fenny; but, assisted by no great industry of the natives, it produces corn, oil, and vegetables for the use of man or beasts. Its chief produce, however, consists in dates, which, from their great quantity and excellence of flavor, render the place proverbial for fertility among the surrounding Arabs of the desert. Each inhabitant possesses one or more gardens, making his relative wealth, and these it is his whole business to water and cultivate. * * * The dates produced are preserved in public magazines, of which the key is kept by the sheik; to these storehouses the dates are brought in baskets closely rammed down, and a register of each deposit is kept.

Horneman refers to the fact that dates are used as a method of exchange and in the place of money in payment of tributes, fines, etc.

Justice is administered according to ancient usage and general notions of equity. Fines, to be paid in dates, constitute the punishments; for instance, the man who strikes another pays from 10 to 50 *kaftas*, or baskets, of dates; these baskets, by which everything in this place is estimated and appraised, are about 3 feet high and 4 or 5 feet in circumference. * * * I was told much of the riches of this people and should suppose there must be men of considerable property amongst them, as they have a very extensive traffic in dates with different and remote countries, pay no tribute, and have little opportunity of dissipating the money they receive.

Horneman was of the opinion that the language of Siwa was "not fundamentally Arabic," but "a dialect of that in use throughout the great nation of Africa * * * and which may be considered as the aboriginal."

He records that the Siwa word for dates is "tena."

Sir Archibald Edmonstone, Bart. (*12*) is regarded as the modern discoverer of the "Inner Oasis, or Dakhla."

The party of Edmonstone left the neighborhood of Beni Adi, on the Nile, on February 11, 1819, and after a journey of six days reached the village of "Bellata" (Belat, of modern maps), in the eastern section of Dakhla. He explored the oasis as far as "El Cazar" (El Kasr) in the northern part of the western section. (See map of "The Oases of the Libyan Desert," by Hoskins (*19*).

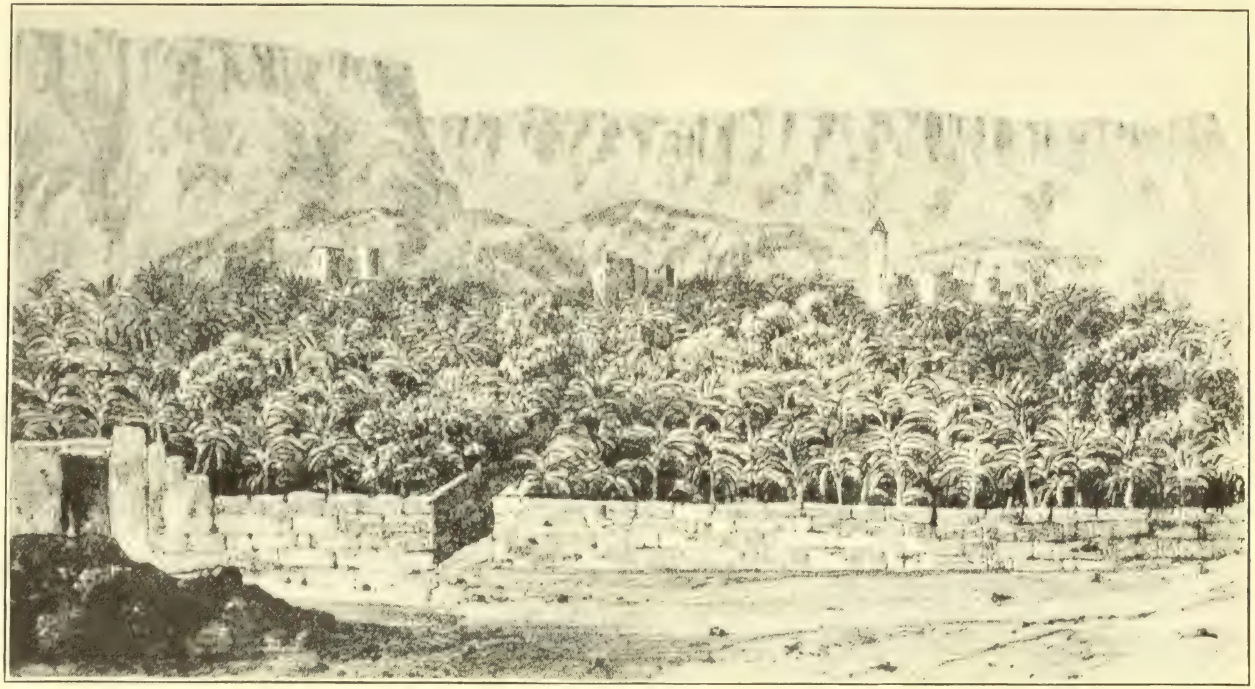
Edmonstone makes frequent references to the date groves, and one plate (Pl. I, photographed from Edmonstone's "View of El Cazar") gives a most realistic picture of the date gardens surrounding the famous "El Cazar" and the escarpment of the Cretaceous cliffs to the northward. He writes of El Kasr as follows:

The situation of this place is perfectly lovely; it is seated on an eminence at the foot of the line of rock which rises abruptly behind it and is encircled by extensive gardens filled with palm, acasia, citron, and various other kinds of trees, some of which I have rarely seen before in these regions.

Edmonstone quotes freely from other explorers, in part as follows:

The fertility of the oasis has been deservedly celebrated. Strabo asserts the superiority of the wine; Abulfeda and Edrissi mention the luxuriance of the palm trees; and Vansleb[6] says, "The best dried dates are brought from Elwah, which region lies 3 days' journey inland from Siout. These are so fleshy and sweet that others would be considered sour and bitter after them."

[6] Vansleb was a Dominican who traveled in Egypt and Nubia in the years 1672–73.



VIEW OF EL CAZAR (EL KASR), DAKHLA OASIS, EGYPT.

From "A Journey to Two of the Oases of Upper Egypt," by Sir Archibald Edmonstone, Bart., London, 1822.

FIG. 1.—SAIDY DATE GARDEN NEAR HAWAMDIA, IN UPPER GIZEH PROVINCE, EGYPT.

Photographed by the author in May, 1920.

FIG. 2.—A SAIDY DATE PALM, 40 YEARS OLD, STILL SHOWING NUMEROUS OFFSHOOTS, NEAR HAWAMDIA, IN UPPER GIZEH PROVINCE, EGYPT.

Photographed by the author in May, 1920.

On page 54 Edmonstone adds: "Dates are an article of commerce with Egypt, and we often met caravans conveying them."

No mention has so far been made of the varieties of dates which were then grown in the oases, and our earliest authority on this is Frédéric Cailliaud (*9*), a young French engineer, who visited the Oasis of "Syouah," going in from Fayum in December, 1819. He thus explains his selection of the route via Fayum:

As I found it impossible to enter Syouah by way of Terraneh, I decided to go by Fayum, joining one of the caravans which go to this oasis for the trade in dates, which they market at Cairo and Alexandria.

From this paragraph we get an important side light on the magnitude of the trade in dates from Siwa Oasis a century ago. Describing the products of this oasis, he says:

The principal trees of the oasis are the date palms, the olives, the apricots, and the pomegranates; more rarely are the fig, the plum, and the apple trees while the doum palms, trees common in the southern oases, do not occur here. Five varieties of dates are distinguished, one of which has no seed; they are called *gazaly, freyeh, sâyd, el-ka'yby,* and *ouaedy;* the first also called *soultany,* are most highly esteemed. Generally the dates of the oasis are superior to those which are produced on the borders of the Nile. The *ouaedy* dates are used for food for camels, donkeys, and other animals. The *sâyd* dates are packed fresh in baskets for exportation. The oasis abounds in dates; this fruit is used extensively in commerce.

Cailliaud took the long caravan trail from Siwa to "El-Ouâh el-Bahryeh," where he arrived January 1, 1820. He thus vividly describes their approach to the oasis as heralded by spots of vegetation and tamarix bushes and finally the appearance of the palm groves:

On the 1st of January, 1820, we set out at half past 9 in the morning following the Ayn-Beledy Valley in the east. The grass, asclepias, tamarix, and the small marshes that we found along our route revealed to us that we were near an oasis. Soon we could see the date palm. With what pleasure we observed this rich verdure in the midst of the sands of the desert, after having endured so much of fatigue, anxiety, and privations! * * *

At midday we arrived at El Quasr, the largest village in the oasis, which the Arabs call El-Ouâh el-Bahryeh, being the most northern oasis on the Egyptian frontier.

Cailliaud spent the greater part of January in studying the antiquities of this oasis and the customs of the people and noted the arrival of a caravan of traders from the Nile:

On the 10th of the month a small caravan came from Minyeh, a town in lower Egypt, loaded its camels with dates, and left after a few days.

Later (p. 177), Cailliaud tells us definitely what these export dates are:

Dates form the principal product of this oasis; although good they are less esteemed than those of the Syouah which surpass all others. The best ones of the region are called *Saydeh;* they are packed, still fresh, in baskets and are exported in this state.

Twelve years later, in October, 1832, Hoskins (*19*) gives this graphic account of the date trees of Kharga and their date commerce with Egypt:

El Khargeh, 20th October.—We rode here in three hours and a half. I shall include in this description of the metropolis of the oasis the information I obtained both now and on a subsequent visit after leaving the antiquities. The view of El Khargeh at a distance is very prepossessing. Its greatest attraction consists in a magnificent thick forest of date trees, which extends probably a mile toward the north and south and is surrounded by a brick inclosure, like

the wall of a park. One or two houses are built in this inclosure, forming, as it were, the gates of the city. The flat roofs of many habitations are visible among the trees; and the domes of two mosques, with their galleries, from which they cry the hour of prayer, are conspicuous, towering even above the lofty palms.

Later (p. 85), this author says:

Many of the sheakhs and merchants are rich and independent. * * * They send their dates to the Nile, where, from their just celebrity, they obtain the highest prices given for that description of fruit; and they bring back in return wheat, of which there is a deficiency in the oasis, sundry articles of wearing apparel, arms, ornaments, spices, coffee, mirrors, glass beads, and other little articles of hardware, and which they sell again at an immense profit. The oasis produces rice, but very inferior to that of the Delta, wheat, millet, dourah (the latter in abundance), and the various fruits which I have mentioned in describing the gardens. Their great source of wealth, however, and all their commerce and prosperity, depend upon their extensive forests of date trees.

Heeren (*16*), in his book published in 1832, has this to say regarding Siwa of his time:

[Page 206:] On the south of the temple, at the distance of a full quarter of an hour's walk, arises, in a delightful grove of dates, the fountain of the sun, formerly sacred to Ammon. It forms a small pool about 30 paces in length and 20 wide. It is said to be 6 fathoms deep, but is so clear that the bottom is seen, from which bubbles continually arise like those of a boiling caldron. The temperature of the water varies; it is warmer at night than in the day, and about daybreak is wont to smoke. It is probably a hot spring, the warmth of which is not observed during the heat of the day. A small brook, which runs from the pool, unites itself soon after to another spring (Herodotus says that there are other wells of fresh water) which likewise arises in the palm grove and runs toward the ruin, near which it forms a swamp, probably because its ancient outlets are stopped up.

The early and high cultivation of the oasis is still shown by its rich produce of dates, pomegranates, and other fruits.

The date is the most cultivated and is obtained in vast quantities and of very fine flavor. In favorable seasons, say the inhabitants, the whole place is covered with this fruit; and the yearly produce amounts to from five to nine thousand camel loads of 300 pounds each. The annual tribute is now also paid in dates. * * *

Following this ancient caravan road to the westward, he narrates:

[Page 213:] Leaving then the lofty palms and the sacred groves of Jupiter Ammon, the last traces of vegetation and animated nature soon disappear.

The southern desert of Barca opens its arid plains, only interrupted by parched barren hills. For 10 days this continues, till at length the date groves of Augila appear, and the wearied caravan again lands on one of those fertile islands which nature has sprinkled with so sparing hand over the sandy ocean of Africa.

Augila is a well-known name both in ancient and modern geography. It is at present the capital of a district which comprises two other villages. Horneman reached it from Siwah after nine long days' journey, which, if we reckon them as ten common ones, confirms what Herodotus states as to the distance between the two stations. Augila owes nothing to its size, nor is there anything remarkable about it; but it is principally known as being the great thoroughfare for caravans, which still touch at it in their route from western Africa to Cairo. Even in the present day a portion of the inhabitants devote themselves to the caravan trade. Besides this, Augila is a principal mart for dates, which have always been found there of an excellent quality and in great abundance. Herodotus expressly remarks that the Nasamones in the Regio-Syrtica annually made a journey to this place in order to purchase a supply of this fruit. (Herodotus (*17*), iv, 182.)

[Page 215:] Augila produces nearly double the quantity of dates that Siwah does. In this manner is the testimony of Herodotus again confirmed.

We thus have, from more than a century ago, circumstantial accounts of an extensive commerce in dates between these four chief

oases of the Libyan Desert and the Nile Valley. And Herodotus bridges the historical gap between the ancient Egyptian and the modern accounts. We have the "Sayd" or "Saydeh" specifically mentioned by Cailliaud (*9*) as the export date of "Syouah" and "Bahryeh," though the "Sultani" is referred to as the choicer variety. This is explained by the well-known preference by the desert dwellers for a dry date rather than a soft date. Beadnell in 1898 and the writer in 1913 found the Saidy to be the great export date both of Kharga and Dakhla. Sheik Abu Bakr of Dakhla then positively stated: "We have this same date in all five of the western oases" (including Farafra).

Considering the great age attained by date palms and the slow change in oriental customs and institutions, there can be little doubt that while the variety was not specifically named for Dakhla and Kharga, the Saidy was the export date of those oases in Cailliaud's time as it is to-day.

How much farther back its history extends can only be conjectured, but a great date industry takes years to establish in any country. Considering that in these oases a century ago was a culture so extensive and well established that caravans from the Nile cities in quest of these dates were of frequent occurrence over well-established trails, a commerce old in the time of the Pharaohs, the origin of the Saidy variety vanishes in the dim past of that marvelous land.

With so extensive and long established a date industry, based on the excellence as well as the packing and keeping qualities of the Saidy variety, it is remarkable that later writers on the dates of Egypt have given it such scant recognition.

Delchevalerie (*10*), "Chief Gardener of His Highness the Khedive," in a rather exhaustive pamphlet, "The National Tree of the Egyptians, the Date Tree," published in 1873, describes by name 30 varieties of dates but makes no mention under those names of the Saidy or "Wahi." His No. 18, however, is "Dattes de l'Oasis Syouy" or, in the Arabic transliteration, "Balah Syouy," of which he says: "Fruits fragrant, very sugary, and of good quality. This variety grows in the Oasis of Syoua, or Jupiter Ammon, in the great Libyan Desert." It must be noted that as in the case of this writer's No. 10 "Balah Yemany," and No. 29 "Balah Sukhouty," this is purely a locality name, not a descriptive, variety name, as his No. 28 "Soubah el Arous," "the bride's fingers." The description was evidently taken from dates imported from "Syoua" Oasis, where no variety under the name of "Syouy" has been listed by any traveler, but agrees well with that of the Saidy, their great export date for a century past. This listing of "Balah Syouy" from the "Syoua" Oasis seems to throw light on the origin of the variety now so extensively grown in Gizeh Province and known there as "Sewi," to which reference will be made later.

Rohlfs (*25*), whose expedition explored the Libyan oases in 1873–4, states, on the authority of Stephan (*26*), p. 32), that the annual exportation of dates from "Siuah" Oasis was 30,000 centners, or 3,000,000[7] pounds, and that during the export season from October

[7] The estimate of Heeren (*16*) was a maximum of 2,700,000 pounds. If Mr. Brown (*6*) is correct in placing the present output of dates from Sewa at "between 740 and 770 tons per year" the export from this oasis would seem to have declined by one-half since Rohlfs' survey.

to the 1st of March caravans of 100 camels were arriving and departing daily, bringing in grain and all sorts of merchandise and loading back with dates. He gives a most realistic account of the great date warehouse, or "Dattelager," shown him by the governor of the city of "Siuah," having mud-brick walls in part surrounded by moats or trenches, but without roof. Here each citizen might store his dates, awaiting transportation or his supply for consumption during the year. He notes that the stores included fruits of the finest sorts, the Sultani and Rhazelli, as well as the common sorts used as food for their domestic animals. But already the usual yearly exportation of about 30,000 centners or hundredweight had been made to the valley, which no doubt comprised largely the Saidy variety.

The practice of storing dates in such warehouses had been noted, it will be recalled, by Horneman in 1798.

The earliest English notice of the Saidy variety is an article on Siwa Oasis in the Geographic Journal, London, by Wilfred Jennings-Bramly (*20*). On page 602 he says:

> They cultivate five kinds of dates. The best, the Ghrasali, is too juicy to be exported; the Faraghi, which will keep from three to four months, is exported to Alexandria. The Saiedii is the common Arab food, of which every Bedouin keeps a store, as it will keep good for a year. Out of it is made the paste called ar-gool, or moona (mortar). The dates are trampled upon until they adhere together into a paste, the sugar in the fruit crystallizing and helping to preserve them. The Sultani, of which Siwa possesses but a few trees . . . is chiefly grown in the small oases. The Gargha [is] the least valued of all and therefore kept for home consumption and camel food. All these dates are dried on the sand of the date yards and carry away with them a good deal of the soil, but to the Arabs this does not seem to detract from their excellence. They are packed for sale in long, flat baskets made of the palm branches called saa, which is a recognized measure for dates, so that you buy half or quarter of a saa. Two saa, one slung on each side, are a camel load.

This writer makes use of a very different transliteration for the varietal names from that used by Cailliaud (*9*), but we can recognize most of the varieties. He missed the commerce in the "Saiedii," which gives it its greatest importance, but brings out its remarkable keeping quality and the characteristic of the graining or sugaring of the flesh after it has been packed for a time.

Ball and Beadnell (*1*), in their account of the agricultural conditions in Baharia Oasis, from a survey begun in 1897, state:

> Dates palms are taxed 15 millièmes per annum [equivalent to 7½ cents]. The number of trees at the 1897 assessment was 93,000, or about 15 per inhabitant. The great article of produce in the oasis is therefore dates, and at the date-gathering season the inhabitants are busily employed in gathering, drying, and packing the fruit for export to the Nile Valley. Three-fourths of the whole date production are exported. The dates are of excellent quality and find a ready sale, the villages of the oasis being crowded with camels and traders from the valley each November. A camel load of dates,[8] packed in two plaited-grass bags, is bought in the oasis for 500 millièmes and is said to be sold in the Nile Valley for four times that sum, so that the Bedouins, to whom the trading is almost wholly confined, even allowing for the difficulties of transport, make a good profit.

Doctor Ball, the chief of this survey, told the writer in September, 1913, that by far the greater number of date trees in Baharia Oasis were of the Saidy variety.

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[8] About 320 pounds; at pre-war prices bought for half a pound Egyptian, or about $2.50 United States money, and sold in the Nile Valley for £E2, or a fraction over 3 cents per pound.

QUEST FOR THE "WAHI" DATE BY THE UNITED STATES DEPARTMENT OF ARICULTURE, PROVING THE IDENTITY OF THE "WAHI," "SEWI," AND SAIDY DATES.

This brings the fragmentary but very vivid and consistent story of the oasis date industry down to the time when the Saidy variety came to the notice of the staff of the Bureau of Plant Industry.

In 1901 David Fairchild, Agricultural Explorer of the Department of Agriculture, saw a date called "Wahi" in the bazaars of Fayum and recognized its excellence in spite of the unattractive packing. From samples sent by Mr. Fairchild to the Department of Agriculture at Washington, D. C., Walter T. Swingle (27) wrote the following paragraph, appearing in Bulletin 53 of the Bureau of Plant Industry, issued April 28, 1904:

> Another sort of great promise is the Wahi, of which samples were secured by Mr. Fairchild in the market of Fayoum, in west-central Egypt. This variety is said to come from the oasis of Seewah, known to the ancients as Ammon, or Ammonium, some 300 miles to the westward, in the interior of the Sahara Desert. The date is brown, less transparent than the Deglet Noor, but rather longer and decidedly broader; the seed is blunter and much more irregular in outline. The flesh is yellowish, granular midway between the skin and the seed, and of a most delicious flavor. This date had been gathered and kept, with no precautions against drying out, for at least eight months when it was received at Washington, but it was still in very good condition, except for the attacks of weevils. It seems to be a better keeper and to have a higher flavor than the Deglet Noor. Nothing is known as to the palm which produces this date, but from the quality of the fruit it is presumably a late-maturing variety.

Mr. Fairchild's notes on the "Wahi" date were published in Bureau of Plant Industry Inventory No. 10 of seed and plant introductions (issued February 8, 1905), where it is described as follows:

> **7001.** PHOENIX DACTYLIFERA. Date.
>
> From Fayum, Egypt. Received through D. G. Fairchild (No. 617), July 1, 1901.
>
> *Wahi.* Twenty kilos of dried fruit of a variety of date which is said to have been brought from Siwah, a small village in the oasis of Bahriyeh. It is to my taste the sweetest drying date in Egypt—at least it is much sweeter than the Amri or any other I have tasted. It has a very peculiar mealy flesh of golden to greenish yellow. The skin is very thin and smooth and of a golden brown shade. Seed short, rather large, and clinging to the meat rather firmly. The flesh is somewhat granulated with the sugar. I can not be certain that this variety did really come from Siwah, but it certainly is a sort not commonly seen at this season in Cairo and is superior in flavor to that which is considered the best in Egypt. The word *Wahi* signifies merely oasis, according to Mr. H. A. Rankin, of Fayum.

From this account it seems that Mr. Fairchild had a clue as to the origin of the "Wahi" date which should have led to the early discovery of its identity with the Saidy. On April 2, 1904, Mr. Swingle wrote to Mr. Fairchild in part as follows:

> I was mistaken in stating that the *Sultani* date is reported for Baharieh, the Petit Oasis; it is the *Saydeh* date which is named by Cailliaud as the best date in the oasis, though he expressly says "not so good as Siwah dates, which are best of all." Of the *Saydeh* he says, "On les entasse, encore fraiches, dans les panniers et on les exports dans cet etat."
>
> There is a *Sayd* date in Siwah also packed in baskets when fresh for export. Probably the *Saydeh* of Baharieh and the Sayd of *Siwah* are identical.
>
> It would be well to ask for offshoots of the *Saydeh* date *if it is different* from the Wahi. [The last italics are the writer's.]

As a matter of fact, Mr. Rankin was closely questioned by Mr. Fairchild on this point, as is shown by the following extract from his letter of April 15, 1904:

W. T. Swingle, who has been making a special study of the date palm, sends me the following notes regarding the dates reported from the oases east of Fayum (copy of notes not attached).

They would seem to indicate that the date under the name of "Saydeh" is the best date which occurs in the Oasis Baharieh, and it is important to determine whether the Wahi date, which is said to come from Siwah, really occurs in the Oasis of Baharieh or if the "Saydeh" is not the sort which really comes to the Fayum and is called by the Arabs "Wahi." Should arrangements be made for you to make the trip to these different oases, we would want suckers of this "Saydeh" date.

An article on the date palm by Fletcher (*14*) in the Agricultural Ledger, Calcutta, 1906, concludes with a table of "well-known varieties of dates" in which appears among others the "Wahi, or Sewi," from the "Seewah Oasis" of Egypt:

Class.	Country.	Center.	Name of variety.	Date of ripening.	Soil requirements.	Market.	Character of fruit.
1. Soft....	Egypt...	Seewah Oasis.	Wahi, or Sewi...	August..	Sandy...	Fayum, Egypt.	Plump and yellow.

Fletcher had before him Bureau of Plant Industry Bulletin 53 and credits Swingle (*27*) with giving considerable material. The source of this combination "Wahi, or Sewi," is difficult to guess. None of the writers who had visited the oasis had noted any variety called "Sewi." Only Delchevalerie (*10*), who was not an explorer, had mentioned "Balah Syouy" from "oasis de Syoua."

We find Foaden and Fletcher (*15*) listing 10 leading varieties of Egyptian dates, and the "Sewi" is again credited to "Sewa Oasis," as follows:

(4) *Sewi*, which as its name indicates, is largely cultivated in the Siwa Oasis, is a comparatively short but thick and yellow date. The ripe fruit is usually pounded and kneaded together into a kind of paste or cake known as "Agoua." The finest sorts are preserved in small skin bags, the stones being first removed, while the common sorts are kept in bags made of date leaves. It is thus largely used as food during the whole year and constitutes one of the chief articles of food among the poorer classes.

The foregoing rather indefinite description might apply equally well to dates from the oases (the Saidy) or to that found in upper Gizeh which has till now been known as the "Sewi." That the "Sewi" of Gizeh Province, orchards of which were actually in sight of the School of Agriculture at Gizeh, of which this author was principal, should have been completely overlooked seems rather astonishing, although in justice to Mr. Fletcher we must add that "Chapter XIII, Fruits," is credited to G. Bonaparte (*4*).

Beadnell (*3*), formerly of the Geological Survey of Egypt, gives the following account of the "Saidi" date:

In Egypt there are about 50 varieties of date palm, the chief kinds in Kharga Oasis being the Saidi, Tamar, Falig, and Hamrawi. The Saidi dates of the oasis are generally considered to be superior in flavor to almost any other Egyptian variety and have in consequence a ready sale in the Nile Valley. The other varieties are not exported to any great extent, except, perhaps, the Falig;

the Tamar, while producing a heavier crop than the other kinds, yields fruit of comparatively poor quality, which is on that account almost entirely used for home consumption * * *. The fruit exported from the oases, being entirely disposed of in the native markets of the Nile Valley, is packed and sewn up without any special care in palm-leaf baskets. For local use small quantities of selected fruit are frequently preserved in a moist state in earthenware jars.

No offshoots under the name "Wahi" were ever imported for planting in this country.

IMPORTATIONS OF THE SAIDY DATE UNDER VARIOUS NAMES.

The first offshoots of the Saidy date secured under that name were received July 26, 1904, through H. A. Rankin, of Fayum, Egypt, who acted under instructions from David Fairchild, Agricultural Explorer of the Department of Agriculture. Mr. Rankin arranged with a Greek merchant, who was going into Baharia with a trading caravan, to bring these shoots. Of a lot numbering 29, there were 15 shoots of the Saidy variety. These were given S. P. I. No. 11485, as recorded in Bureau of Plant Industry Bulletin 97 (Inventory No. 11), issued March 15, 1907.

In February, 1905, Mr. Rankin, under instructions from Mr. Fairchild, made a journey from Alexandria to Siwa Oasis, where he purchased 114 offshoots, comprising six varieties, of which 42 offshoots were of the Saidy variety. These were received in New York on March 23, 1905, and the "Saydy" offshoots were listed in Inventory No. 11 under S. P. I. Nos. 15215 and 15220.

In October, 1901, the Department of Agriculture had received through Mr. Fairchild, from Em. C. Zervudachi, a Greek merchant of Alexandria, a consignment of offshoots of six varieties from Lower Egypt, which included several labeled "Oga de Bedrichen,"[9] which were designated S. P. I. No. 7632. Three trees of this lot can still be identified in the cooperative Date Garden at Tempe, Ariz. They are in no way to be distinguished from the Saidy trees from Baharia and Siwa procured by Mr. Rankin. In 1910 the writer prepared a general description of the character of these "Oga de Bedrichen" trees at Tempe, Ariz., which is here quoted from his unpublished manuscript notes.

OGA DE BEDRICHEN, S. P. I. NO. 7632 (28).

Trees of vigorous growth with very thick trunks and long, stiffly outcurved leaves, which give the mature top a spread of about 80 degrees. The very broad, thick leaf bases have a clear exposure of 12 or 15 inches below the first spines and taper gradually to the heavy rib, which is strongly rounded dorsally and has wide lateral faces. The rib diminishes steadily to a quite slender apex; the outcurve is mostly made at the base, the body of the blade being rather stiff, but with graceful flexibility at the top.[10]

A summing up of the leaf characters discloses, first, a lower leaf armed with powerful spines set at very effective angles for defense; second, a broad blade due to the rather long pinnæ and strong axial spread of the introrse and retrorse pinnæ classes, with a deep valley of the antrorse pinnæ through the broader part of the blade; but in the outer 3 or 4 feet all classes spread out

[9] The spelling "Bedrichen," is retained to designate the trees grown from this consignment. The place name is "Bedrashen."

[10] For a manual of the terms used in describing date-leaf characters, see "Botanical Characters of the Leaves of the Date Palm Used in Distinguishing Cultivated Varieties," Bulletin 223, United States Department of Agriculture, by the writer of this bulletin (21).

to a nearly flat blade with broad, coarse, overlapping pinnæ. The uncured fruits are about 1⅞ inches long, 1¼ or 1⅜ inches in diameter, irregularly egg shaped. They are a rich orange color in ripening, dull tan when mature. The thick amber-colored flesh is a little coarse, but very rich and luscious. The seeds, about 1 inch long by three-eighths of an inch broad, have mostly rounded ends, a rather shallow ventral furrow, and the germ pore nearly central. In the heavy soil and unusual moisture conditions, together with the cooler climate of the Tempe Garden, this variety has perfected but little edible fruit, and the ripening has been very uneven.

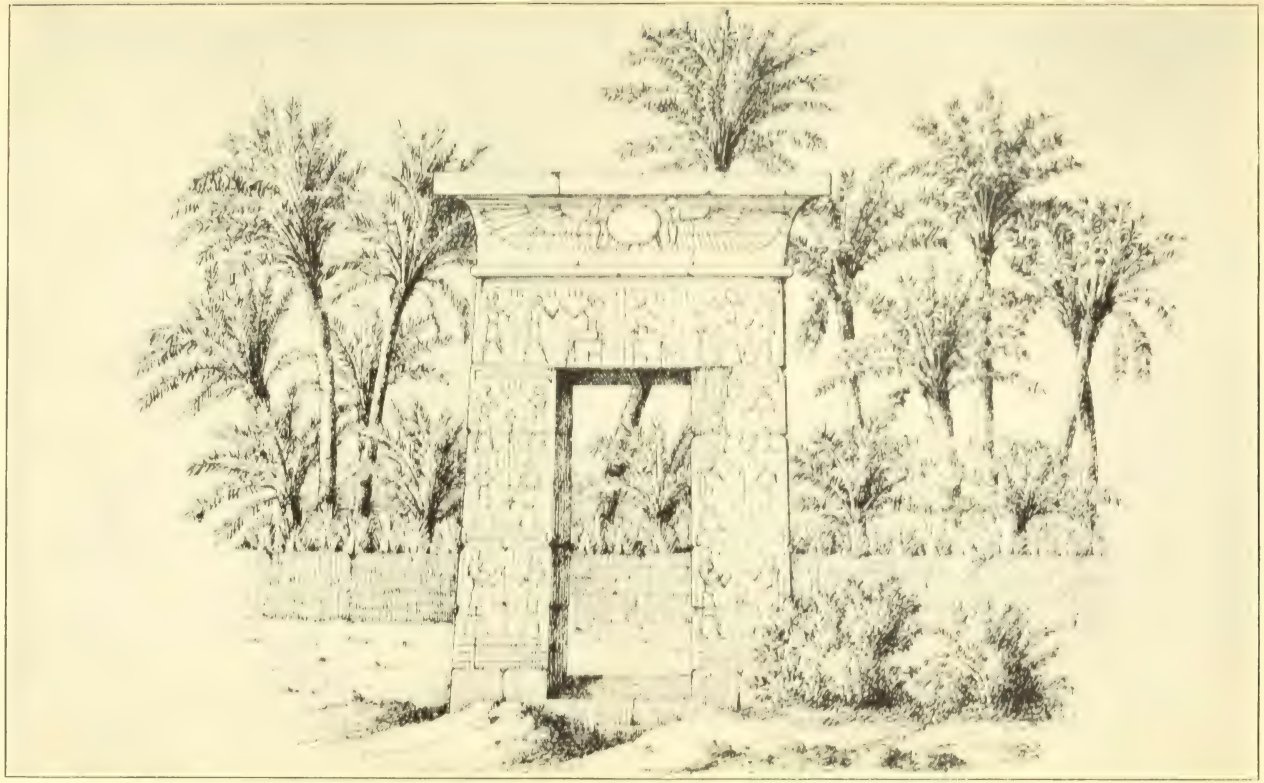
By the use of this description the writer identified the "Oga de Bedrichen" trees at Tempe, Ariz., with trees called "Sewi" which he examined in September, 1913, in the gardens at Bedrashen and later in the section about Hawamdia and Abu el Nemrus. (Pl. II, Figs. 1 and 2.)

During the following October the writer visited Kharga and Dakhla Oases of western Egypt, and there observed the very close similarity of the Saidy variety, the great commercial date of the five western oases, with the "Sewi" of Gizeh Province. Near Kharga village are the imposing ruins of the temple built by Darius I at Hibis, about 500 B. C. (Pl. III.) It was from luxuriant Saidy palms growing beside this temple gateway that the writer made the first critical study of the leaf and fruit characters which was to establish the identity of the Saidy with the "Sewi" variety of Gizeh.

It was also during a stay of a week in late October at Rashida village in Dakhla Oasis, a center of extensive Saidy plantations (Pl. IV, Fig. 1), that another interesting bit of information was picked up. The date harvest was nearly completed, and a camel caravan from each district was starting for the river by the "Derb el Tawil" or "Long Road" nearly every night. In a conversation the Sheik Abu Bakr, the omda of the village, expounded the importance of the Saidy variety to the western oases substantially as follows:

This date is the one marketable commodity we can depend upon in all of these oases. We have the same variety in all of them. We have it in Siwa, away to the north. We have it at Baharia, very many trees. We have it at Farafra. We have it, as you see, here in Dakhla, more than anywhere else. We have it at Kharga, where you came through. We can raise enough rice and wheat for our bread, but we must have something to sell to get sugar and tea and cloth and some money to pay our taxes, and this date is what we all depend upon. We all call it by the same name, the Saidy, but when these Bedouin traders get over to the valley with it they call it the "Wahi."

It was thus through this conversation with a friendly oasis sheik, 200 miles back in the Libyan Desert, that the location and the true identity of the long-sought "Wahi" date was learned after 12 years of search. The solution of the puzzle is really quite simple. The Arabic for an oasis is "wâh," feminine "wâhât"; thus Dakhla, in an Egyptian census of taxable date palms, is "el Wahat el Dakhla." The Bedouin traders, ever fond of making a mystery of where they obtain their goods, call this date in the valley bazaars "Wahi," vaguely, the date from "el wâh," or the oasis, so that the name Saidy is quite unknown to the Egyptian public. In the same manner Hayany dates grown in the district near Birket el Hadji, the "Pool of the Pilgrims," on the borderland between the delta and the hot sand dunes of the Arabian Desert, being the earliest of that variety to reach the market, were known as "Bala Birket el Hadji."



TEMPLE BUILT BY DARIUS I AT HIBIS (NEAR KHARGA VILLAGE), KHARGA OASIS, EGYPT, ABOUT 500 B. C.

Photographed by E. L. Crandall, from an old print.

FIG. 1.—SAIDY DATE GARDEN NEAR THE VILLAGE OF RASHIDA, DAKHLA OASIS, EGYPT.

Photographed by the Author in October, 1913.

FIG. 2.—A YOUNG SAIDY TREE IN FRUIT AT THE COOPERATIVE DATE GARDEN, TEMPE, ARIZ., IN OCTOBER, 1915, FRUIT NOT YET MATURE.

FIG. 1.—PACKING SAIDY DATES IN UPPER GIZEH PROVINCE, EGYPT.

FIG. 2.—A CAMEL LOAD OF SAIDY DATES AS THEY ARRIVE IN FAYUM EGYPT, FROM THE OASIS OF BAHARIA.

Photographed by the Author in November, 1913.

FIG. 1.—A CAMEL LOAD OF "GERIDEH," OR RIBS OF THE DATE-PALM LEAVES, USED FOR MAKING PACKING CRATES, MARG, EGYPT.

Photographed by the Author in April, 1920.

FIG. 2.—DATE-PALM CRATES AFTER UNPACKING AT THE GOVERNMENT DATE GARDEN, INDIO, CALIF.

Photographed in September, 1920.

Zervudachi, mistaking this local description for the real name of the variety, shipped Hayany offshoots to Mr. Fairchild under the name of "Birket el Haggi," and it was not until the writer's visit to Cairo in September, 1913, that this confusion was straightened out, though the Hayany is by far the most abundant date in the delta region of Egypt.

The identity of the "Wahi" with the Saidy was further confirmed in the following November, when the writer visited Fayum in company with T. W. Brown, horticultural director of the Egyptian Ministry of Agriculture. At Abshawa, or Ebchawai, a village in western Fayum, a Bedouin trader was found just in from the desert with a small camel train loaded with dates which he called "Wahi." (Pl. V, Fig. 2). At first he claimed that he had come from the Siwa Oasis, though every one in the village knew that he had never been there, but under the cross-questioning of the omda, or village headman, admitted that he had bought his dates in Baharia Oasis, 6 days' journey from Fayum. A bag of his dates was purchased, and examination showed them to be identical with the Saidy dates seen in Dakhla. These dates were shipped to Mr. Fairchild at Washington, who positively identified them with the "Wahi" dates he had seen in Fayum 12 years earlier.

Thus the identity of the "Wahi" and Saidy was established. It may be interesting at this point to compare the description of the Saidy date of the oasis and the "Sewi" dates of Gizeh, as prepared by the writer from notes made in the gardens in the autumn of 1913 and published in 1915 in Department Bulletin No. 271 (*22*).[11]

SAIDY.

(Saidi, Wahi.)

Trees with heavy trunks and stiffly spreading leaves 10 to 14 feet long, the heavy ribs with very broad bases.[12] There is a space of clear petiole of 12 to 15 inches below the first spines. The rib is strongly rounded dorsally and tapers but slowly, its outcurves being stiff rather than graceful.

The spine area is from 2½ to 3½ feet, the spines of medium weight or quite heavy, placed singly and rather scattered, from 2 inches long below to 7 or 8 inches in the upper area, and passing into a stiff ribbon pinnæ or spike pinnæ 20 to 24 inches long and one-half to three-fourths of an inch wide. The normal pinnæ following these at 4 to 5 feet are 20 to 24 inches long and 1¼ to 1⅝ inches wide, but dropping steadily in length to 12 to 14 inches near the apex. Their greatest width of 1½ to 1¾ inches is reached at about three-fourths of the blade length from the base. The pulvini are unusually heavy, deeply cream colored, or slightly brownish in exposed places. The pinnæ are rather coarse and harsh, 0.018 to 0.019 of an inch or sometimes 0.025 of an inch thick and conspicuously bluish green with a heavy waxy bloom. This bluish green color is very noticeable when the leaves are seen in a mass.

The 4-ranked arrangement of the pinnæ is conspicuous, and the narrow axial angles and strong angles with the blade plane formed by the lower antrorse pinnæ give the leaf a bristling and formidable appearance. The valley is close and narrow nearly to the apex of the blade. The pinnæ groups are of the normal types till quite near the apex, and the paired groups of the antrorse-retrorse type are largely in the majority.

The orange-yellow fruit stalks are strikingly long, of medium weight, or rather heavy in some cases.

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[11] Since this bulletin is out of print, it seems desirable to quote from it at length those parts which bear upon the identity of the dates which have gone under the names "Wahi," "Oga de Bedrichen," and "Sewi."

[12] Notes in parenthesis following color terms in this and following pages refer to plate numbers in Color Standards and Color Nomenclature, Robert Ridgway, Washington, 1912.

The fruit[13] is 1½ to 1⅝ inches long, seven-eighths of an inch to 1 inch broad, blocky, with broad square base rounding to a broad obtuse apex. The skin is rather coarsely wrinkled both longitudinally and transversely and partially loosened from the flesh. The darker portions of the flesh have a translucent appearance and are nearest to "liver brown" (R. XIV)[14] in color, with a delicate lavender bloom.

A basal zone of about one-fourth the length of the fruit is a "tawny olive" (R. XXIX) and is opaque in appearance. The flesh is three-sixteenths of an inch thick, firm, slightly granular, somewhat sticky; an outer zone of one-third of the thickness is of the exterior color, while the nearly transparent inner portion is close to "olive ochre" (R. XXX), with a little more suggestion of green.

The flavor is heavily sweet, rich, and a little cloying, but of the quality usually sought after by date purchasers in this country. After being packed seven months the quality is in no way impaired, and where not reached by weevils these dates would sell as well as at Thanksgiving time. No variety has been tried that stood the test better.

The seeds are five-sixteenths of an inch to 1 inch in length, three-eighths of an inch broad, smoothly rounded, the germ pore nearly central, the ventral furrow narrow and shallow, the color close to "tawny olive" (R. XXIX).

The fruits, packed in paper boxes and rather dry, averaged 35 to 40 to the pound. The percentage of seed weight to the total weight of fruit is 11.6, a ratio too high to mark this date as of absolutely first quality, yet with its other good qualities a great deal can be allowed in this respect.

These fruits ripen in the heat of the Libyan oases in October. Whether they will find sufficient heat for their perfection in any portion of the United States outside of the Salton Basin is perhaps doubtful. Temperature records of only one of these oases have been kept. A record of seven years at Dakhleh (Table I) shows a mean annual temperature of 74° F., which is slightly higher than that of Palm Springs, Calif.; and for the growing months of February to October, inclusive, a mean of 78.40° F. The summation of heat units is about the same as that of Tuggurt (Tougourt) in Algeria, which suggests about the same temperature requirements as for the Deglet Noor. This indicates that this variety may be expected to reach maturity in the United States only in the heat conditions afforded by the Salton Basin of California or in the hot lower portion of the Colorado Valley from Needles to the Mexican line.

This variety, as seen by the writer, is the great export date of Khargeh and Dakhleh Oases, and Sheik Abu Bakr, of Dakhleh, is authority for the statement that it is the chief date of the entire chain of oases of the Libyan Desert, from Siwah at the northwest, which lies about 400 miles southwest of Cairo, through Baharieh, Farafreh, and Dakhleh to Khargeh, the most southeasterly, lying 120 miles due west of Luxor.[15]

They have together an extreme north to south range of about 300 miles through a practically rainless region of dry air and intense desert heat. Siwah is said to be 78 feet below sea level. The other oases of the chain lie at elevations ranging from near sea level to three or four hundred feet above. Only Khargeh has railway connection with the Nile Valley; from the other oases the dates reach the Nile Valley by camel caravans commanded by Bedouin traders who buy the entire export crop of the desert people at their gardens.

The common occurrence of this date as the leading variety of the widely detached oases, while it is unknown in the Nile Valley,[16] suggests that they have had it in possession a long time, perhaps dating back to a period when allegiance to the Egyptian Government was not acknowledged and when communication was much more free and regular by the desert trails between the oases than that between the oases and the Nile Valley.

In the enumeration of the taxed date palms of Upper Egypt for 1907 the oasis of Baharieh is credited with 98,996, Dakhleh with 106,344, and Khargeh

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[13] Notes made near the Temple of Nadurah, Khargeh Oasis, Oct. 8, 1913.

[14] Described from fruit packed in cartons at Sheik Abu Bakr's, Rashida, Dakhleh Oasis, Oct. 18, 1913.

[15] Siwah is approximately 25° 30′ east of Greenwich and in 29° north latitude. Baharieh is crossed by the meridian of 29° and lies just north of 28° latitude. Farafreh lies close to the intersection of the meridian of 28° and the parallel of 27°. Dakhleh lies about equally on either side of the meridian of 29° and at about 25° 30′ north latitude. Khargeh lies with its greatest extent north and south about 30° 40′ east and from 24° 30′ to 26° north latitude.

[16] Unless the Siwah of Gizeh Province proves to be identical

with 65,521, or a total of nearly 271,000 trees. Siwah and Farafreh are not reported.

From observations in Khargeh and Dakhleh and from the crop seen coming in from Baharieh, the writer is satisfied that considerably more than half of the trees in these three oases are of the Saidy variety, so that a low estimate would give 150,000 or 200,000 of these without including Siwah Oasis, where it is known to be the chief tree.

A very interesting bit of exploration history attaches to the procuring of this variety. David Fairchild, in an agricultural exploration of Egypt in 1901, purchased in Fayum a quantity of dates which he regarded as the finest he had seen in Egypt and which he was told were "Wahi" from the village of Siwah in the oasis of Baharieh. Though it was known to Mr. Fairchild that the term "Wahi" had reference to the oasis, it was supposed for many years that this was the varietal name of the date, and three different men had been dispatched with commissions from the Office of Foreign Seed and Plant Introduction to procure offshoots of this desirable variety. During the writer's trip to Dakhleh Oasis he learned from Sheik Abu Bakr that Saidy, the export date of the Libyan oases, is sold by the Bedouin traders when they reach the Nile Valley as "Wahi," the date from "el Wah," or the oasis. Samples of the fruit, purchased in the markets of Wasta, in Fayum, and directly from the traders under the name of "Wahi," proved perfectly identical with samples of Saidy brought from Dakhleh and Khargeh, establishing beyond question the Saidy as the long-sought "Wahi." Though 108 Saidy offshoots were purchased in Khargeh on this trip, the first introduction of Saidy offshoots dates from the purchase through Mr. H. A. Rankin, S. P. I. No. 11485, in 1904, said to be "from Fayum." As this variety is not known in the Fayum country, it is probable that Mr. Rankin secured the offshoots through Bedouin traders from the oasis of Baharieh, between which points there is constant traffic.

Another interesting phase of the whole discussion is the very close resemblance, if not the absolute identity, of the Saidy with the Siwah grown in the upper sections of Gizeh Province.

SIWAH (SIWI).

(Notes made near Hauamdiyeh, November 5 and 17, 1913.)

Trees of the Siwah date have large heavy trunks with coarse scales from the leaf bases and heavy, stiffly spreading tops. The leaves are 14 to 15½ feet long, with very heavy bases, strongly rounded lower rib, which tapers gradually but still remains stiff and heavy at the apex. The spine area is from 2½ to 4 feet, the spines very strong and heavy, bluntly acute, from 2 to 8 or 9 inches long. The stiff, coarse pinnæ following these are 24 to 29 inches long and 1 to 1¼ inches broad. They diminish regularly in length toward the apex and increase in breadth up to 10 or even 11 feet from the base, being usually 17 to 20 inches long and 1⅞ to 2 inches broad at 8 to 10 feet from the base and 11 to 14 inches long and 1¼ to 1½ inches broad at the apex. Many of the upper pinnæ have the proximal fold broadened into a wing and are decurrent. The pulvini on the spines are unusually heavy and dark cream colored, being somewhat lighter on the less exposed pinnæ. For the first 6 feet of the blade the pinnæ comprise only the antrorse and retrorse classes in the paired antrorse-retrorse groups, above which the introrse pinnæ appear, and also the triple (antrorse-introrse-retrorse) groups with a few quadruple (antrorse-introrse-introrse-retrorse) groups. In the outer 2 feet of the blade the introrse class predominates, or all classes become merged. The 4-ranked arrangement of the pinnæ in the blade is strongly maintained, but is especially pronounced in the lower portion, where the bristling ranks of the antrorse pinnæ vary strongly from those of the retrorse and give to the leaf a strong attitude of defense. The remarkably long and heavy orange-colored fruitstalks of this variety are almost identifying in their character. They may be 2½ inches in diameter and 50 to 60 inches long to the fruiting head, or portion bearing the strands, or "shamrokh." The fruiting head is 16 to 24 inches long, bearing strands 24 to 40 inches long upon only the outer 12 to 18 inches of which the fruit is borne, the basal portion being straight and irregularly four sided.

The fruit is 1⅜ to 1½ inches long, 1 inch broad, oblong or slightly broadest a little beyond the middle, with a rather square blocky base and obtusely rounded apex. The color of the fruit on the tree is a brilliant yellow, not far from "wax yellow" (R. XVI) or "light cadmium" (R. IV). The fruits

are picked before they are fully ripe and are dried in the sun on a hard earthen floor, or the floor may be spread with a thin layer of date leaves. The first quality of fruit ripens to a color near "hazel" (R. XIV) or "tawny" (R. XV), but it is semitransparent except the basal portion, which is often opaque and of a "honey yellow" or "chamois" color (R. XXX). Fruits of a very good quality may be considerably darker, close to "bay" or "chestnut" (R. II), but either class held against the light will show the seed through the flesh quite plainly. The skin is very thin and transparent, and the outer portion of the flesh is of the same shades given for the outside appearance, while the inner flesh is considerably lighter. In good "agwa" that has been packed several months the outside of the fruit is shiny, as though dipped in a sugar sirup, and is a little sticky.

The flesh is less sticky than the outside and a good deal granular. The flavor is a rich sugary sweet, with a suggestion of caramel, and very agreeable.

The seeds, large for the size of the fruit, are about three-fourths of an inch to 1 inch long, three-eighths of an inch broad, roundish in cross section, and may be called oblong oval in form, a little broader in the middle and with broadly rounded ends. The germ pore is about central, the ventral surface a little corrugated, the furrow narrow and shallow. The color is close to "wood brown" (R. XL).

When sufficiently cured the dates are packed solidly into strong, deep, circular baskets made from the braid of date-leaf pinnæ sewed spirally, and a cover of the same material is stitched closely on. The whole mass thus inclosed becomes sealed with the exuding sirup of the sticky dates and is practically airtight. If cleanly and sanitary methods could be followed, there is no doubt that this method of packing is an excellent one, and there is reason to believe that a curing process goes on in the mass which gives a flavor and texture of flesh not secured when the individual dates are packed in their natural shape in paper cartons without compressing and so exposed to the air.

The rather large seed is all that prevents this date from being classed as a strictly first-class variety, judged by its actual merits as a date. That the product that goes on the market is not above third class needs only a view of it in the market stalls to prove. One has but to see the yards and the curing and packing in progress to be convinced that such a product is the only possible result of the antiquated and filthy, not to mention insanitary, methods employed. Dried on the bare, dust-covered ground or on a floor thinly spread with date leaves, covered with flies, swept with the dust of passing traffic, finally tramped with the naked feet into the huge date-leaf sacks, the writer was not surprised to learn that the wholesale price realized for these dates by the grower is only about 4 or 5 millièmes to the rotl, the equivalent of 2 or 2½ cents per pound.

In December the retail price of the Siwah in the native markets of Cairo was 1 piaster per rotl, while at the same time in the best fruit and provision stores, patronized by European customers, there was an active trade in the Algerian Deglet Noor, in fancy packages labeled "Dattes Muscades," at prices the equivalent of 5 piasters per rotl. From samples of Siwah dates obtained from private sources, carefully selected and packed for home use, the writer is convinced that the first quality of dates, packed in a modern and attractive way, would be competitors with the Algerian dates on at least an equal footing and would be the choice of many people of refined taste. Of course, not all of the Siwah crop could be converted into a first-class pack under the best of conditions, but a sufficiently large proportion, with proper methods, could be brought up to the first quality to make the difference in price between 1 piaster and 5 piasters per rotl run into a good many thousand pounds sterling for a year's output. What the French in Algeria and Tunis have done to improve the date output of those countries, what is recently being done with the dates of the Persian Gulf region, ought not to be beyond accomplishment for Egypt with such dates as the Siwah and the Saidy for a foundation.

A question of nomenclature comes in here which is rather typical of the whole date situation in Egypt, and arises from the habit of the people of giving to a date the name of the locality from which it is brought, as "Wahi" for any date from the oases, "Yemeny" for dates from the Yemen district of Arabia, etc.

In the shipment of date offshoots received by Mr. Fairchild in 1901, through Em. C. Zervudachi, of Alexandria, one lot, given the S. P. I. No. 7632, was labeled "Oga de Bedrichen" and in some of the lists this name became transformed into "Oga de Bedreschen." Two trees under the above number and

one received without a label were recognized by the writer as identical, and careful notes were made of the leaf and fruit characters, all of which were strongly marked and characteristic.

As no such name occurred in any of the published lists of Egyptian dates, there was naturally considerable interest in the true identity of so conspicuous a variety. Consequently, on arriving in Egypt one of the writer's earliest excursions from Cairo was to the native village of Bedrashen (variant spellings, "Badrashen" and "Badreshein"), a prominent date growing and shipping point on the west bank of the Nile, about 10 miles above Cairo. It is the stopping point for excursionists to the historic site of ancient Memphis and Sakkara, and perhaps no spot in the Nile Valley has witnessed more of the glory of ancient Egypt than this. At the present time there are no more magnificent date groves to be found in Egypt than those that surround this town, Hauamdiyeh, and a number of other villages between Bedrashen and Gizeh. The soil is a rich sandy loam, capable of producing heavy crops of general produce, and maize is frequently grown beneath the date trees. Going out among the date growers and inquiring for a variety named Oga de Bedrashen, brought the unvarying response that they knew of no such variety. They had only Siwah and Amhat, a few Hamrawi, and some "balady," their name for dates of local origin, or seedlings. On looking over their garden the young trees of the Siwah had a familiar appearance, and a later visit gave time for the study of the leaf and fruiting characters in detail. Only one conclusion could be reached—the variety we had received under the name of "Oga de Bedrichen" is no other than the Siwah, the leading variety of the Bedrashen and Hauamdiyeh district and the chief packing date of Upper Egypt. The mudirieh of Gizeh has 435,000 taxed date trees, and at a rough estimate 100,000 of them are of the Siwah variety. With the exception of a few trees that are being planted in Fayum, there seems to be little known of this variety outside of Gizeh Province, and within that it is chiefly confined to the section south of Gizeh station and to a district on the west side of the valley and north of the pyramids. Of its origin or the date of its introduction into this district, nothing could be learned. The name at once suggested an introduction from the oasis of that name. But unlike Dongola Province, where they preserve a distinct tradition of having obtained their date varieties from the Sukkot country, these people have no record of the introduction of the Siwah into their country, and they insist that it originated there.

The situation is further complicated by the fact that there is an exceedingly close resemblance between the Siwah and the Saidy, the great export date common to the entire chain of oases of western Egypt, from Siwah at the northwest, to Baharieh, Farafreh, Dakhleh, and around to Khargeh. A most careful comparison of all the characters of trunk, leaf, and fruiting stalk fails to show points of constant difference between these varieties, unless it is in the thickness of the fruiting stalk, which, on the whole, seems to be lighter in weight in the Saidy than in the Siwah. How growing in the same soil conditions would affect them in this respect can only be determined by trial. The fruits are so closely related in character that the oasis Saidy variety, as packed and brought to the Nile Valley, shows no constant differences that will distinguish them from the Siwah of Bedrashen, though individual lots may vary considerably. The question again arises of how the varieties would behave if grown side by side in identical soil conditions. The rich soil of Bedrashen and Hauamdiyeh might produce somewhat different results in a variety than would be produced in the rather poor, sandy soils of Khargeh and Dakhleh Oases, in which the writer studied the Saidy. Trees of "Saydy," S. P. I. No. 11485, fruited in 1912 in a very sandy soil at the Mecca Date Garden in California, and were considered by Bruce Drummond, in charge of the Indio and Mecca Date Gardens, to be identical with the "Oga de Bedrichen" (Siwah) of Tempe. The writer at first concurred in this opinion, but with a more detailed examination of the Mecca plants concluded that they were distinct. After seeing both varieties, as grown in Egypt, to still regard them as distinct, with so many points of identity, can only be accounted for in one way. The Siwah, from its narrow dissemination, is possibly the younger variety and a seedling springing from the Saidy, the fruit of which has found its market in the valley for many years. Analogy for an even closer resemblance of a seedling to its parent is found in James Reed's "Pioneer" seedling of the Deglet Noor, produced at Thermal, Calif.

There is another point that makes it of importance that the Saidy and the Siwah should be tested in identical situations. The ripening of the two varie-

ties is about simultaneous, in spite of the remoteness of the localities and marked difference in the temperature. At Dakhleh the mean temperature for the nine months of the growing period, from flowering to date harvest, February to October, inclusive, is 78.40° F. That of Heluan, the nearest record point to the Siwah date field, for the same period is 72.54° F., or 5.86 degrees lower. As shown in Table I, the summation of heat units from May to October, inclusive, is 1,079 higher at Dakhleh than at Heluan. These figures, showing so many more available heat units for the Saidy than for the Siwah, would lead us to expect it to ripen earlier, provided the varieties are identical, and they offer the strongest argument presented in support of a varietal difference between the two.

The maximum yield of Siwah at Bedrashen is given as 100 kantars of 320 pounds to the feddan, practically 1 acre, or often only 60 or 70 kantars. The maximum yield would then be 32,000 pounds to the feddan, which, allowing 100 trees to the feddan, would give a yield of 320 pounds to the tree. At 80 piasters per kantar the money return would be £80, or $400. Placing the yield at 60 kantars, the more probable average, the crop would be 19,200 pounds, or 192 pounds to the tree. At the minimum price of 60 piasters per kantar the return would be £36 to the feddan, or $180 per acre; 70 kantars, a medium yield reported, would equal 22,400 pounds, or 224 pounds to the tree, a not unreasonable yield. This, at 80 piasters, would give £56, or $280 to the feddan or acre. This, it should be remembered, is on land valued at the rate of £100 to £200 per feddan.

T. W. Brown (*6*), whose valuable paper, published in 1916, is the most reliable and technical study of the date culture of Egypt yet made, considers the "Saidi" and "Siwi" as separate varieties, though admitting that they are "very closely allied." He says, "It has been suggested that the difference of the fruit of the two kinds is due to differences of climate. Is it not more probable that the Siwi has originated from seed of the Saidi?" However, no constant differences in botanical characters can be found to support the idea that the "Sewi" of Gizeh is a seedling of the Saidy of the oasis. In the writer's judgment the migration by offshoots of Saidy from Siwa Oasis is the more probable explanation. Culturally and commercially there seems to be no discernible difference. The young Saidy trees from the importations of 1904 and 1905, now growing in the Cooperative Date Garden, at Tempe, Ariz., are in no way to be distinguished from the trees of "Oga de Bedrichen" imported in 1901. The "Oga de Bedrichen" trees have been identified with the "Sewi" of Bedrachen and Hawamdieh. There can be no doubt, therefore, that the Saidy variety of the Libyan oases and the "Sewi" of Gizeh Province are one and the same. Any slight differences can be explained by difference in soil, water supply, and atmospheric temperature and humidity. Their positive identity under similar environment in Arizona and California seems to be no longer in question. The name "Sewi," indicating its origin in the Siwa Oasis, is no more than must be expected. With the bringing into the Nile Valley perhaps of caravan loads of Saidy dates from the oasis of Siwa for centuries past, what could be more natural than the desire to possess and cultivate this excellent and celebrated date in the Nile Valley? Merchant caravans made their headquarters at Kerdaseh and other villages along the desert border of the Nile bottoms opposite Cairo. Twelve days from Siwa in February, their favorite month for moving offshoots, would put a camel load of Saidy offshoots from Siwa into the rich bottom lands of Gizeh.

In November, 1921, the writer visited the little Bedouin village of Abu Roash, a mile beyond the ruined pyramid of that name. It is built against the rocky base of Gebel Abu Roash, by some ancient

cave tombs, yet the pyramid range of flood basins brings the Nile flood water to it. The camping places of the Siwa caravans are all around, and many of the men have been over the desert trail.

The first man met was a Bedouin who had a few palms and a little garden which he watered from a shadoof. One of his "Sewi" palms, he claimed, went back to the time of Mohammed Ali, which would make it about 100 years old. He said he had been to Siwa and that they had the same palm there. The people in Siwa called it the Saidy. When I asked him if he was absolutely certain that the date called the Saidy by the people of Siwa was the same as the "Sewi," he declared that he was and expressed astonishment that there could be any doubt about it.

Some time later at the esbet, or village, where a man told me that the first caravan with dates from Siwa had arrived and was encamped some distance away, he showed me a handful of the dates he had obtained from the caravan and insisted that they were "Sewi," though the dates were quite unmistakably what we know as the Saidy.

When these Bedouins, who have known this caravan trade from boyhood, assume it as a matter of common knowledge that the dates of the wahat (Saidy) and those of the Gizeh ("Sewi") are the same, I believe it leaves no reasonable doubt of their being one and the same variety.

In December, 1921, further confirmation of this was secured at Kirdasa, a native village on the border of the desert, about 5 miles northwest from the Pyramids of Gizeh. Its territory lies above the last canal, but much of it is flooded when the irrigation basins are filled. The chief industry is date growing, and the Amhat, Sewi, and Hayany are its chief varieties. The omda of the village states that they have about 20,000 trees of the "Sewi" variety. The village is near the mouth of Wadi el Natrun, through which the great caravan trail from Siwa Oasis and westward has passed for many centuries. It was from "Kardassi" that Frederick Horneman set out with a company of merchants of Aujila in September, 1798, becoming the second modern European explorer to reach Siwa. The father of the present omda had made the journey to Aujila, and the omda and his brother, 75 years old, have been familiar with this caravan traffic from boyhood, the great camping places of the caravans being near their home. They stated that while the caravans brought a few dates of what they regard as the choicer variety, the Ghrasali, the great volume of the export dates from the wahat, or oasis country, is of the Saidy variety, known to the merchants as the "Wahi," because it is the date they obtain from the wahat. Both men asserted positively that the Saidy which the caravans brought from Siwa Oasis and the "Sewi" of their "belad" or country were the same.

It was their opinion that the "Sewi" came originally from the wahat, probably from the "belad" of Siwa. They believed that the variety had been in their village as much as 150 years, and they themselves had trees that they thought were more than 100 years old. The older man pointed out trees which he said were as tall as they now are when he was a boy. Though they were inclined to believe that the "Sewi" variety had come from seed instead of "shettla," as they had never heard of any "shettla" being brought

from Siwa Oasis, they admitted a little later that they had trees of the Ghrasali from "shettla" that had been brought from Siwa, thus establishing the point that "shettla" could be brought from there and live.

The writer's trip to Egypt in 1920 resulted in the importation by the Department of Agriculture of 1,000 authentic Saidy offshoots from Kharga Oasis and of 1,000 shoots, now known to be of the same variety, carefully selected from the best plantations in the section about Bedrashen in Upper Gizeh. Plates VI and VII show materials and methods of packing these offshoots for shipment to America. All of these trees have been planted in quarantine nurseries in the Coachella Valley in California. In the fall of 1921 the writer returned to Egypt and by the middle of March, 1922, shipped to the United States about 7,000 offshoots of the Saidy variety, most of which were obtained in the vicinity of Gizeh. About 650 were secured from Kharga.

A summary of the importations of the Saidy date by the Department of Agriculture, beginning with the original shipment of "Wahi" fruits, is as follows:

As "Wahi" (fruit only), from Fayum, said to come originally from the oasis of Baharia, by Fairchild, S. P. I. No. 7001, in 1901.
As "Oga de Bedrichen" (a few offshoots), from Hawamdia, by Zervudachi, S. P. I. No. 7632, in 1901.
As "Saydy" (a few offshoots), from Baharia, by Rankin, S. P. I. No. 11485, in 1904.
As "Saydy" (a few offshoots), from Siwa, by Rankin, S. P. I. Nos. 15215 and 15220, in 1905.
As Saidy (a few offshoots), from Kharga and Dakhla, by Mason, in 1914.
As Saidy (1,000 offshoots), from Dakhla, by Mason, in 1920.
As "Sewi" (1,000 offshoots), from Gizeh, by Mason, in 1920.
As "Sewi" (about 6,500 offshoots), from Gizeh, by Mason, 1922.
As Saidy (about 650 offshoots), from Kharga, by Mason, 1922.

As can be seen from this summary the Department of Agriculture has received offshoots of the Saidy date from four of the upper oases in the Libyan Desert, and also from the Nile Valley near Gizeh. Offshoots from all five of these localities are now growing in the Government date gardens in the Southwestern States, and their identity and the identity of the Saidy from all of these localities has been established beyond question. Eight importations of offshoots of this variety have been made from Egypt, the first in 1901, the last in 1922, and altogether about 10,000 offshoots of this variety have been brought to the Southwestern States.

Nowhere in Egypt is it possible to see growing side by side Saidy offshoots from all these different localities. This final conclusive demonstration as to the true nature of the 200,000 or more date palms growing in the Nile Valley near the pyramids has been worked out in the date gardens in the Coachella Valley in California, where these offshoots have been proved to be identical with the Saidy variety from the upper oases of the Libyan Desert. The discovery of the true nature of the "Sewi" variety in the Nile Valley has opened up to the date grower a large supply of offshoots where good transportation facilities make them obtainable at moderate prices. It is very doubtful whether enough offshoots could have been obtained from the oases of the Libyan Desert to have permitted the rapid growth of the

FIG. 1.—OFFSHOOTS OF SAIDY DATES AS THEY ARRIVED AT THE PACKING SHEDS OF THE HORTICULTURAL EXPERIMENT STATION, GIZEH, EGYPT.

Photographed by the author in May, 1920.

FIG. 2.—ONE OF THE 450 CRATES USED IN PACKING THE 9,000 DATE-PALM OFFSHOOTS SHIPPED FROM GIZEH, EGYPT, TO INDIO, CALIF.

Photographed by the author in May, 1920.

A BOX OF SAIDY DATES GROWN AT THE COOPERATIVE DATE GARDEN, MECCA, CALIF., DURING THE SEASON OF 1920.

Natural size. Photographed by E. L. Crandall, November 16, 1920.

culture of this very promising date on a commercial scale in California within a reasonable time.

THE SAIDY DATE AS A COMMERCIAL VARIETY.

The superior quality of the Saidy dates was recognized by the management of an English concern, The Corporation of Western Egypt, which had established trading stores in Kharga and Dakhla some years prior to 1913. They had packed the fruit in paper cartons under the brand "Dakla Dates" (shown in Pl. XIV, Department Bulletin 271) (22) and had shipped the bulk of the crop of one year to England. The enterprise had failed to yield a profit, along with all the other activities of this corporation, in this instance, the managers claimed, owing to the extra cost of moving such packages by the long camel transportation involved.

In the native methods of packing as seen by the writer at Rashida, the dates are gathered before becoming fully ripe and spread in the sun in drying yards, often in the open court of their houses, for several days, being occasionally turned. They were then packed in bags braided from the date-leaf pinnæ, holding about 160 rotls, or pounds, each. (Pl. V, Fig. 1.) After the dates were firmly pressed into these bags, making a compact air-excluding mass, sealed by the slightly exuding sirup of the fruit, a circular piece of matting of the same material as the bags was sewed on as a lid, and the dates were ready for camel transportation, two balancing bags weighing 320 rotls constituting a load for a desert camel. As the oasis people own very few camels, this traffic is chiefly in the hands of the Bedouins, who are shrewd traders, largely obtaining the dates in exchange for goods brought from the valley, thus loading their camels in both directions and making a handsome profit on each transaction.

Egypt, with more than 11,000,000 people to whom dates are a staple article of food and only about 7,000,000 date palms, exports but few dates, only a few hundred tons of the Amri variety, a large coarse date produced in the eastern delta region, being sent to southern Europe, and these are more than counterbalanced by the imports of dates from Algeria and the Persian Gulf and by the dates brought down the Nile from the Sudan. While a few trees of the Saidy variety, from both the oases and the Nile Valley, have borne abundantly at the Tempe, Ariz., garden, but little fruit has matured and none has reached perfection (Pl. IV, Fig. 2). So it was only when trees came into bearing at the Mecca garden and their fruits were cured and packed by the same processes that had been developed for the handling of the Deglet Noor that the splendid market qualities of this new commercial variety were brought to light.

The characteristics of this variety which promise for it such high place among the few great market dates of the world are:

(1) Its quality and flavor. It is a superior date which at once commends itself to lovers of fine fruits. Size and appearance count for little if on trial the quality is found wanting. It is rich in sugar, so rich as to be even cloying to some persons, when freshly packed, though greatly enjoyed by others; but this cloying quality disappears after the fruit has been packed a month or more. By that time the flesh begins to take on a slightly granular character,

instead of the more or less tough or "gummy" texture many dates take on with age, and its most rich and satisfying flavor is developed. While the Saidy when freshly ripened does not have the peculiar indefinable aroma and flavor characteristic of the Deglet Noor, on the other hand, it has something which the Deglet Noor has not, viz, an improvement in flavor upon storage, due to a slow granulation of the sugar content, a quality unique with this variety.

(2) Its handsome appearance (Pl. VIII). Its large size, 1⅝ inches long by an inch broad, attracts the eye as a smaller fruit could not. In the package it has a bright "amber brown" color (R. III) or the deeper shades of "chestnut" or "bay." It looks "good to eat." Then its "honey yellow" (R. XXX) colored flesh when broken is equally attractive and fully sustains the expectancy awakened by the outward appearance. The relatively large seed, weighing 20 to the ounce, or 11 per cent of the total weight (against 32 to the ounce in the Deglet Noor) is a technical fault, but one that does not seem to prejudice the consumer.

(3) Packing and keeping qualities. There are many varieties of dates of fine appearance and exquisite flavor which are so low in their sugar content that they are quickly fermentable and must be eaten within a few hours or days at most after they are fully ripe. The Saidy date may be picked from the tree before it is fully mature, sun cured for a few days in drying yards, and after packing will improve in quality for two or three months and remain in perfect condition for more than a year. The processing practiced at the Indio laboratories is a scientific application of the same principles used by the Arabs in sun curing their fruit before it becomes fully ripened, but with sanitary conditions insured and the necessary heat subject to precise regulation. The Saidy responds perfectly to such treatment and is one of the best varieties in retaining its high quality.

While processing and packing experiments have so far been very satisfactory much remains to be done. Indications are that for long keeping, the choicest flavor and texture are best obtained by gathering the fruit while still hard, but with its sugar all laid down, and after the preliminary maturation in air-tight moist chambers with temperatures definitely controlled, packing it in boxes holding 2 or 3 up to several pounds in such a manner that the air is expelled and the fruit sealed by its own sirup. The enzymic action which follows under these conditions seems to effect a more nearly perfect ripening than when the individual fruits are exposed to the air.

(4) Productiveness. The Saidy date is counted as a heavy cropper in the Libyan oases, though data as to the actual yield per tree are not obtainable. Many trees were seen by the writer in the Kharga and Dakhla Oases apparently bearing 200 pounds or more to the tree. Brown (*6*) quotes the yield of Saidy dates in the oases as 90 to 160 pounds per tree. In Gizeh heavily loaded trees of "*Sewi*" were the rule in 1913, and the yields were estimated by the owners at from 200 to 300 pounds per tree. Mr. Brown, as quoted above, reports the average yield per tree of "*Sewi*" in 1914 for a number of trees at each of three villages in upper Gizeh as follows: Kirdasa, 234 pounds; Hawamdia, 321 pounds; Gizeh, 225 pounds; or averaging 260 pounds. The abundant water supply in the upper Gizeh

territory, where the "*Sewi*" is grown, compared with the scant supply from failing artesian wells received by many Saidy gardens in the oases, may in part account for the difference in the yields reported. It should also be remembered that the Saidy reports from the oases are mere hearsay, as compared with definite weight records for one year at Gizeh Province.

(5) Ease of propagation. The Saidy has been found prolific in offshoots, both in the Libyan Desert at Kharga and Dakhla, and in the Nile Valley in upper Gizeh. It produces offshoots abundantly, 20 or more to the tree, in the heavy adobe soil with high ground water and the limit of alkali at the Tempe, Ariz., garden and in the rather sterile beach sand at the garden at Mecca, Calif. Two thousand offshoots, cut and packed in Egypt in May and June, 1920, endured the long transit to Indio, Calif., remarkably well.

This variety promises to be prolific and reliable in the hands of the careful propagator, thus rounding out the list of characters essential to a great commercial date variety.

TEMPERATURE REQUIREMENTS OF THE SAIDY DATE.

Our knowledge of the temperature requirements of the Saidy date is not as clear as could be desired, owing to the lack of weather records adequately covering the territory where it is grown, but enough data are available to afford a basis for some fairly definite conclusions. Egyptian records of the Dakhla Oasis, the home of the Saidy, may be compared with the records at Heluan and Gizeh, approximating the temperature of the Nile Valley district. In the United States carefully kept 10-year records at the Mecca garden are available for comparison with equally careful records of the Tempe garden, where this date has failed to mature.

The only record representing the five Libyan oases is that kept by an Egyptian observer stationed at Mut, the capital town of the Dakhla Oasis, and from the internal evidence of these records as published in the reports of the Egyptian ministry of finance some doubt may be permitted as to their entire accuracy. Moreover, while the Dakhla records may fairly represent Kharga, also in nearly the same latitude, they must be considerably too high for Baharia, situated nearly 200 miles farther north, and especially high for Siwa Oasis, which lies fully 4° of latitude north of Dakhla. Calculated from the gradation of mean temperatures according to official records, from Abbassia to Merowe in Sudan, which show an approximate gain of 1° F. in mean temperature for each degree of latitude, we may expect Baharia and Siwa to have about 3° F. lower means than Dakhla and Kharga. As Baharia is one of the best producing localities for the Saidy date, we may safely conclude that the mean temperatures at Dakhla and Kharga are at least 3° or 4° F. higher than are actually necessary for the safe maturing of this variety. Siwa Oasis, 1 degree farther north than Baharia, has doubtless a slightly cooler climate and is known to produce excellent Saidy dates.

No records have been kept within the area occupied by the Saidy date in upper Gizeh Province, the nearest available being those of the Gizeh post office and of Heluan, across the river from Bedrashen. Gizeh may closely approximate the temperatures of the points in the lower valley lands near the river, as Abu el Nemrus and Hawamdia:

while the Heluan records may better represent Bedrashen and El Marazic and such points on the west side of the valley toward the desert bluffs as Sakkara and Abusir.

Table 1 shows the normal mean, monthly, and maximum temperatures, in degrees F., and Figure 3 the corresponding curves for

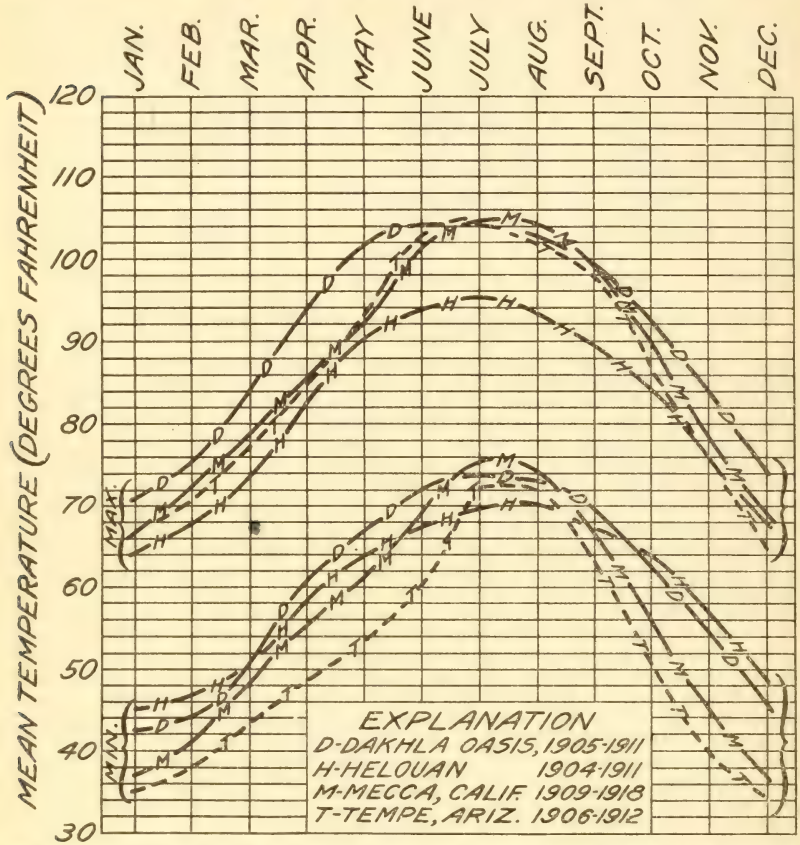

FIG. 3.—Diagram showing the normal monthly mean maximum and mean minimum temperatures, in degrees F., for Dakhla Oasis and Heluan, Egypt, in comparison with the same for Mecca, Calif., and Tempe, Ariz.

Dakhla and Heluan, in Egypt, in comparison with the records for Mecca, Calif., and Tempe, Ariz.

In regard to the behavior of the Saidy offshoots from the Libyan Desert and from Gizeh we have, first, the observations at Mecca and Tempe showing that they display no characters in form and quality of the fruit or in time of maturity by which they can be distinguished as distinct varieties, so they can be treated as one for temperature study; and, second, trees from both these sources have ripened their crops at Mecca with heat units to spare, while at the Tempe garden, though setting abundant crops of fruit, little of it has matured even as far as the processing stage.

Before taking up the study of the maximum and minimum temperatures of the regions involved, it is instructive to plot the monthly

mean temperature curves of Mecca and Tempe on the diagram of means of 12 Egyptian and Sudan stations (Fig. 4), heretofore published (*22*). The difference in the form of these two American curves, as compared with those of Egypt, must at once call attention to the different type of climate into which this date has been transplanted in America. The American curves are higher and narrower toward the apex than any of the Egyptian—that is, the range of monthly means for Mecca is greater than for Dakhla or for any Egyptian station except Aswan, but the extreme summer temperatures are not so long sustained. For the first two months of the year the American stations have the temperatures of the cooler stations of Egypt, but pushing relatively higher and passing all the Lower Egypt stations as the season advances, though escaping the extreme heat of the "Desert tropical" (*22*) stations and of Dakhla from March to June. Through July and August alone Mecca is hotter than Dakhla, and Tempe is equal to it. But the Mecca curve drops below all the upper Nile stations in September to the level of Dakhla and falls below all Egyptian and Sudan stations from October to the end of the year.

TABLE 1.—*Monthly mean, maximum, and minimum temperatures, in degrees F., of Dakhla Oasis and Heluan, in Egypt, and of Mecca, Calif., and Tempe, Ariz.*

Month.	Dakhla Oasis.		Heluan.		Mecca, Calif.		Tempe, Ariz.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
January	71.0	42.3	64.2	45.1	66.3	36.9	67.5	35.3
February	75.2	43.9	67.6	46.8	72.3	41.2	70.3	37.9
March	83.5	50.0	73.0	50.4	78.4	48.9	76.9	43.5
April	93.4	60 6	82.6	59.0	85.7	55.1	84.5	48.1
May	101.7	66.2	90.7	63.7	91.3	60.3	93.0	52.4
June	104.0	72.1	93.6	67.3	101.8	68.1	103.1	60.5
July	104.0	73.4	95.5	69.6	104.1	75.8	104.2	72.2
August	103.1	73.0	93.9	70.2	104.8	74.2	102.3	72.7
September	99.1	69.8	89.6	67.3	99.5	67.1	99.6	63.3
October	93.0	62 6	84.6	64.4	89.5	55.5	87.1	50.2
November	84.0	54.7	75.7	56.3	78.6	44.6	75.4	39.5
December	74.1	44.6	67.5	48.4	68.3	36.5	64.8	34.1
Average for the year	90.5	59.4	81.5	59.0	86.7	55.4	85.7	50.8
Annual mean	74.9		70.2		71.0		68.2	

Saidy palms at Mecca must make up in the extra heat of July and August for the heat units in which Dakhla has been ahead from March to June. That they actually do this is proved by the fact that the Saidy trees at Mecca ripen their fruit a little earlier, if anything, than those at Dakhla.

The Tempe mean curve has the same form as that for Mecca and is nearly parallel with it, but after January it is about 3° F. lower throughout the year. From the relation of this curve to that of Heluan we should expect the Saidy to ripen at Tempe, for it shows Tempe to be the warmer station by from 3° to 6° F. through June, July, August, and September. It is only the analysis of the maximum and minimum temperatures of these stations that shows where Tempe fails.

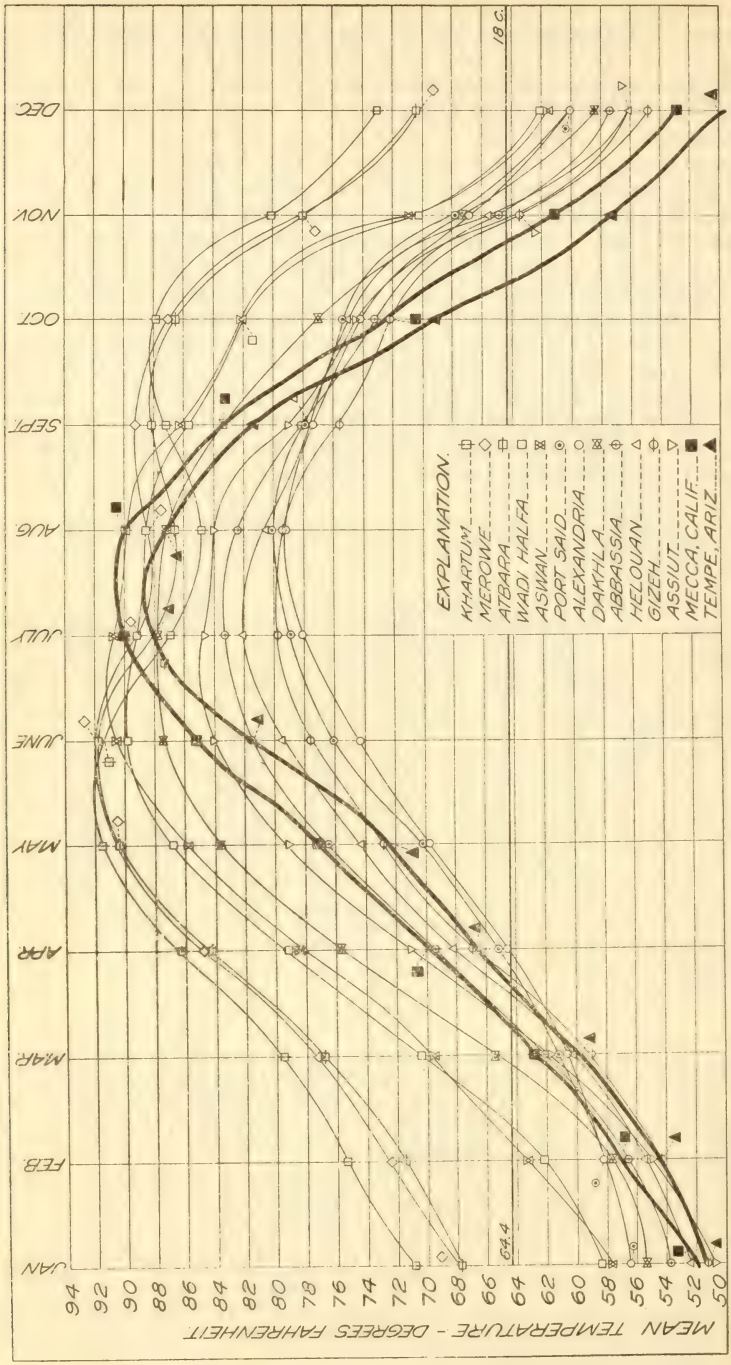

FIG. 4.—Curves showing the mean monthly temperatures in relation to the assumed "zero point" (64.4° F.) of the flowering of the date palm for 12 localities in Egypt and the Sudan, as compared with two localities (Mecca and Tempe) in the United States.

Comparing first the Dakhla Oasis with the Mecca garden in California, both points having an excess of heat above the requirements of the Saidy date, we may note that Dakhla has higher annual means (both maximum and minimum) by 3.5° or 4° F. than Mecca, but the Dakhla curves are broader ones, showing much higher maxima for March, April, and May, nearly the same as Tempe and Mecca from June to September, but with Mecca about 3° F. hotter in August. The Mecca minima are above those of Dakhla for both July and August.

Now, from the deductions relative to the temperature of Baharia made in a previous paragraph we must presume that the temperatures at Mecca more closely approximate those of Baharia than those of Dakhla. What Table 1 does not show is the occurrence of actual frost temperatures in Dakhla, but, quoting from the same authority, absolute minima of 0° C. were recorded in both January and February between 1905 and 1911, though the writer has been assured that nothing more than light frosts are ever experienced there.

At Mecca, on the other hand, there is an average of 20 frosty nights in the year, and the lowest annual minima of the record for 10 years range from 13° to 26° F. Fortunately, these extreme minimum temperatures endure for only a short period, usually not exceeding 30 minutes, as shown by the thermograph trace, and the frost never penetrates the growing center, though at 13° to 17° F. most of the outer leaves were killed.

Comparing the Dakhla records with those of Heluan, the mean maxima at Heluan are found to be from 6° to 11° F. lower throughout the year, the greatest difference being for the month of May. The mean minima for the year are nearly the same for Dakhla and Heluan, but the curves cross about March 15 and September 15—that is, Heluan has warmer nights in autumn, winter, and spring, but the nights are cooler than at Dakhla from the middle of March to the middle of September. Heluan is practically frostless, though Gizeh shows minima in January as low as —2.5° C., or 27.5° F. The harvest in the Nile Valley is prolonged to about two weeks later than in Dakhla. Frost would not interfere with the Nile Valley harvest before the new year, but the relative humidity at Heluan, always higher than at Dakhla, advances to 58 per cent in September and October and 62 per cent in November, while at Gizeh the humidity reaches 72 per cent in September and 75 per cent in October. It is evident that this upper Gizeh district has little heat to spare for the ripening of a choice packing date, and it is probable that it is practical cultural experience that has confined the field of culture of this date to the territory from Gizeh southward.

Our next inquiry should be, why this date, whether derived from the Libyan Oasis or from Gizeh, has failed to mature fruit at the Tempe garden. The annual mean maximum for Tempe is 85.7° F., only 1° below that of Mecca, where both the Libyan and Gizeh Saidy strains have ripened perfectly, some years early in September. The Tempe maximum curve is above the Heluan curve throughout the year, except for falling slightly below in November and December. It is far above it, practically with Dakhla, during June, July, August, and September.

It is to the Tempe minimum curve that we must look for an explanation of the failure to mature fruit of this variety. This curve falls

below all the others, only passing Heluan in July and August. There is a wide zone between it and the minimum curve of Mecca from flowering time to midsummer, falling below it by 7° and 8° F. even when the Tempe maximum passes that of Mecca, as it does in May and June. Heluan, with its moderate mean maximum of only 81.5° F., against 86.7° F. for Mecca and 85.7° F. for Tempe, has as a compensation a mean minimum for the year 8° higher than that of Tempe, 14° higher for the month of October, and nearly 17° higher for November.

Added to the cold nights, the Tempe garden has another handicap. The water table is at all times within 3 to 4 feet of the surface, so that the palm roots are in a constantly saturated subsoil, and no irrigation has been needed since 1907, when the present canal system of the valley was inaugurated. The sinking of the surplus water from irrigation at higher levels has created an underflow which has waterlogged many acres of land in the vicinity of this garden. Surface evaporation brings up so much alkali, chiefly sodium chlorid, that scarcely any weeds grow in the garden, a condition detrimental to fruit ripening. While the night temperatures are generally low in the Salt River Valley, it is believed that in localities having a warm sandy loam with good drainage and relatively free from alkali the Saidy date might ripen to a point where it would process into a fine product, with sufficient sugar concentration to make it keep without fermentation.[16]

RESISTANCE OF THE SAIDY DATE TO HUMIDITY AND DEW-POINT CONDITIONS.

A further comparison between the Saidy date and the Deglet Noor lies in its relative resistance to atmospheric humidity. In Deglet Noor plantations at the Tempe date garden and at Heber, Calif., when cool nights have developed a dew point during the latter part of August or early September, the fully grown but only partly matured fruits have developed spots of brown-rot, of some undetermined species, especially around the stalk, and dropped from the trees in large quantities. With a change to drier air this would sometimes cease at Heber and the rest of the crop mature.

The Saidy trees at the Tempe garden have not been known to suffer from these dew-point conditions.

In Gizeh Province the relative humidity is much higher than at either Tempe or Mecca. At Gizeh the average percentage is: August, 68; September, 72; October, 75. There is present on the leaves of the date palm growing in warm, humid stations, such as the lower coast regions of California and the southern Gulf Coast, a fungus of the group of smut fungi, *Graphiola phoenicis*. This, with other species, may be found on palms cultivated in greenhouses and conservatories, but seldom, if ever, occurs in the drier, more desertlike stations where the date palm usually is grown. It is a valuable humidity index, though seldom a serious detriment to date-palm growth.

[16] This present year, 1922, under conditions of an exceptionally dry summer in the Salt River Valley, some dates on the Saidy trees in the Tempe garden are ripening, thus increasing the probability that this variety may be matured in the drier and warmer localities of that section.

This fungus was observed by the writer on the leaves of the Saidy and other varieties of the date in gardens in the section near Bedrashen in upper Gizeh, where the Saidy fruits heavily and is matured and packed in great quantities. Through the kindness of Thomas W. Brown, director of the horticultural section of the Ministry of Agriculture at Gizeh, the following communication was procured from the director of the meteorological service of the ministry of public works, physical department, under date of March 21, 1921:

> Our records show that at Gizeh on an average the temperature falls below the dew point on 20 days in each of the months September and October, causing fog at some time of the early morning. We have no records for the Hawamdia district itself, and though it is not likely to be very different from Gizeh, I think that the fogs would be of rather less frequent occurrence there.

The evidence of these Egyptian weather records, confirmed by the presence of this fungus, is that the Saidy date will mature without loss with the relative humidity of the ripening months at from 68 to 75 per cent and with the frequent occurrence of dew point and fog. From this we may safely conclude that the occasional dew points of the Imperial Valley in California during the ripening season need not be feared for this variety. This information is of the highest importance, for it opens up to the culture of the Saidy date a vast area in the Imperial Valley of California and in the lower Colorado Valley of both California and Arizona, where the culture of the Deglet Noor has proved hazardous on account of dew-point conditions during the ripening season.

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